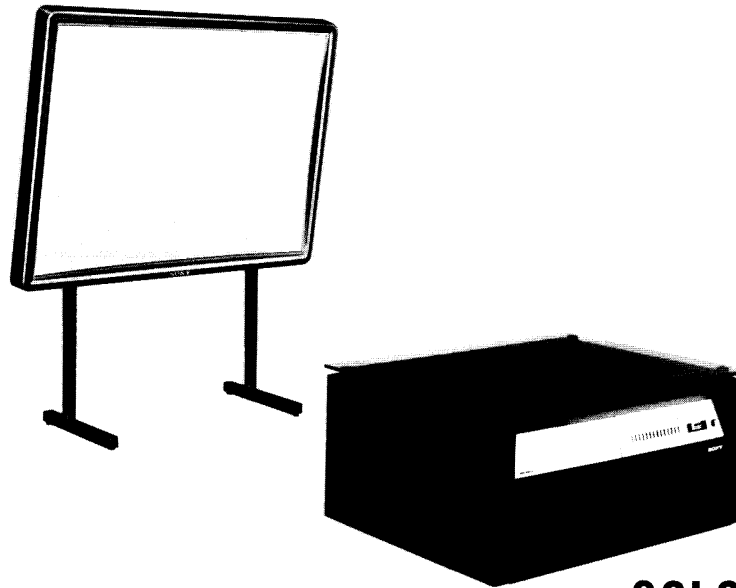


# KP-5020/7220

Chassis No. KP-5020 : SCC-316A-A

KP-7220 : SCC-317A-A

*US Model*



## COLOR VIDEO PROJECTION SYSTEM

### SPECIFICATIONS

#### WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

#### SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ! ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

<b>Projected Picture Size:</b>	50 inches diagonally (KP-5020) 72 inches diagonally (KP-7220)
<b>Audience Area:</b>	Viewing distance 3.0 m (10 ft) minimum to 18.3 m (60 ft) maximum (KP-5020) 3.6 m (12 ft) minimum to 24.4 m (80 ft) maximum (KP-7220) Optimum seating arrangement within approx. 45 degrees from center
<b>Throwing Distance:</b>	Approx. 1.8 m (6 ft) (KP-5020) Approx. 2.5 m (8 ft) (KP-7220)
<b>Screen Material:</b>	Aluminum foil concave screen
<b>Projection System:</b>	3 picture tubes, 3 lenses horizontal in-line system
<b>Picture Tube:</b>	5.5-inch high-brightness monochrome tubes
<b>Projection Lens:</b>	F1.0/130 mm plastic lenses
<b>Television System:</b>	American TV standards
<b>Channel Coverage:</b>	VHF channels 2 - 13 UHF channels 14 - 83 (a total of up to 14 preselected channels)

— Continued on page 2 —

# SONY

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# SERVICE MANUAL

**Antenna:** VHF: 75  $\Omega$  unbalanced antenna terminal  
UHF: 300  $\Omega$  balanced antenna terminal

**Intermediate Frequencies:** Picture i-f carrier: 45.75 MHz  
Color subcarrier: 42.17 MHz  
Sound i-f carrier: 41.25 MHz

**Sound System:** 4.5 MHz intercarrier

**Speaker:** 2 speakers, 10 cm (4 inches) dia., 8  $\Omega$  dia.,

**Audio Output:** LINE OUT (2 phono jacks)  
0.44 V (−5 dB), approx. 10 k

**AC Outlet:** 300 W (max.)

**Automatic Controls:** ABL (automatic brightness limiter)  
ACC (automatic color control)  
ACK (automatic color killer)  
AFC (automatic frequency control)  
AFT (automatic fine tuning)  
AGC (automatic gain control)  
ANC (automatic noise canceller)  
AVR (automatic voltage regulator)

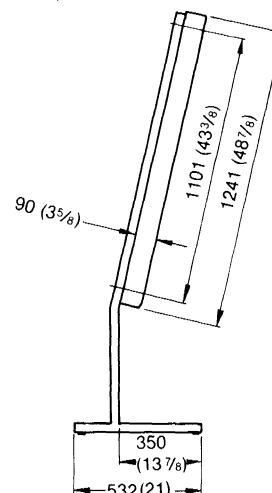
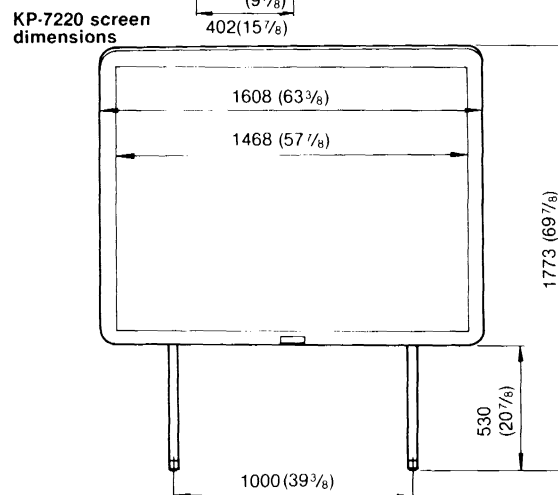
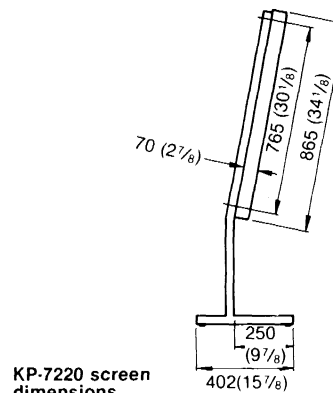
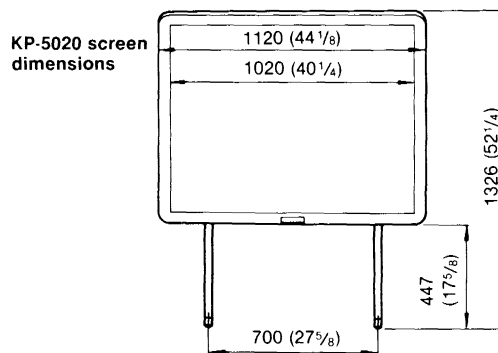
**Power Requirements:** 120 V ac, 60 Hz

**Power Consumption:** 130 W (max.), 100 W (average)

**Dimensions:** Projector  
Approx. 830 (w) x 424 (h) x 650 (d) mm  
32  $\frac{3}{4}$  (w) x 16  $\frac{3}{4}$  (h) x 25  $\frac{5}{8}$  (d) inches  
including projecting parts and controls  
Screen  
See the figure

**Weight:** Projector  
Approx. 50.6 kg, 111 lb 9 oz  
including top board of 13 kg, 28 lb 11 oz  
Screen  
KP-5020: Approx. 8.9 kg, 19 lb 10 oz  
KP-7220: Approx. 17.2 kg, 37 lb 13 oz  
including screen supports

**Accessories Supplied:** Channel number segments  
Antenna connector  
(300–75 matching transformer is built-in)  
Instruction manual

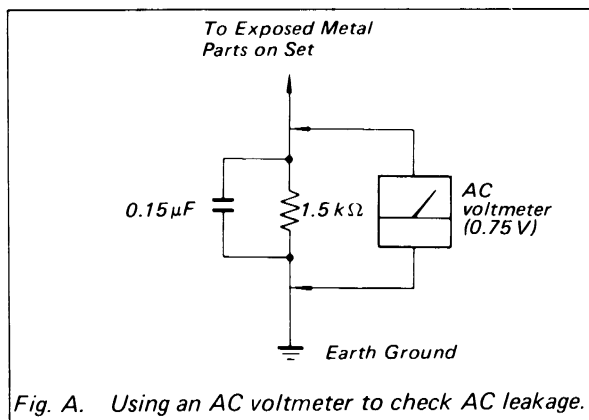


unit: mm (inches)

## SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any).  
Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate; be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.



## LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamperes). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

## HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60-100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

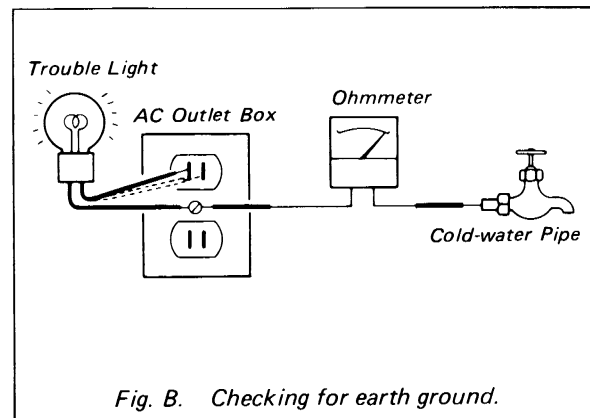
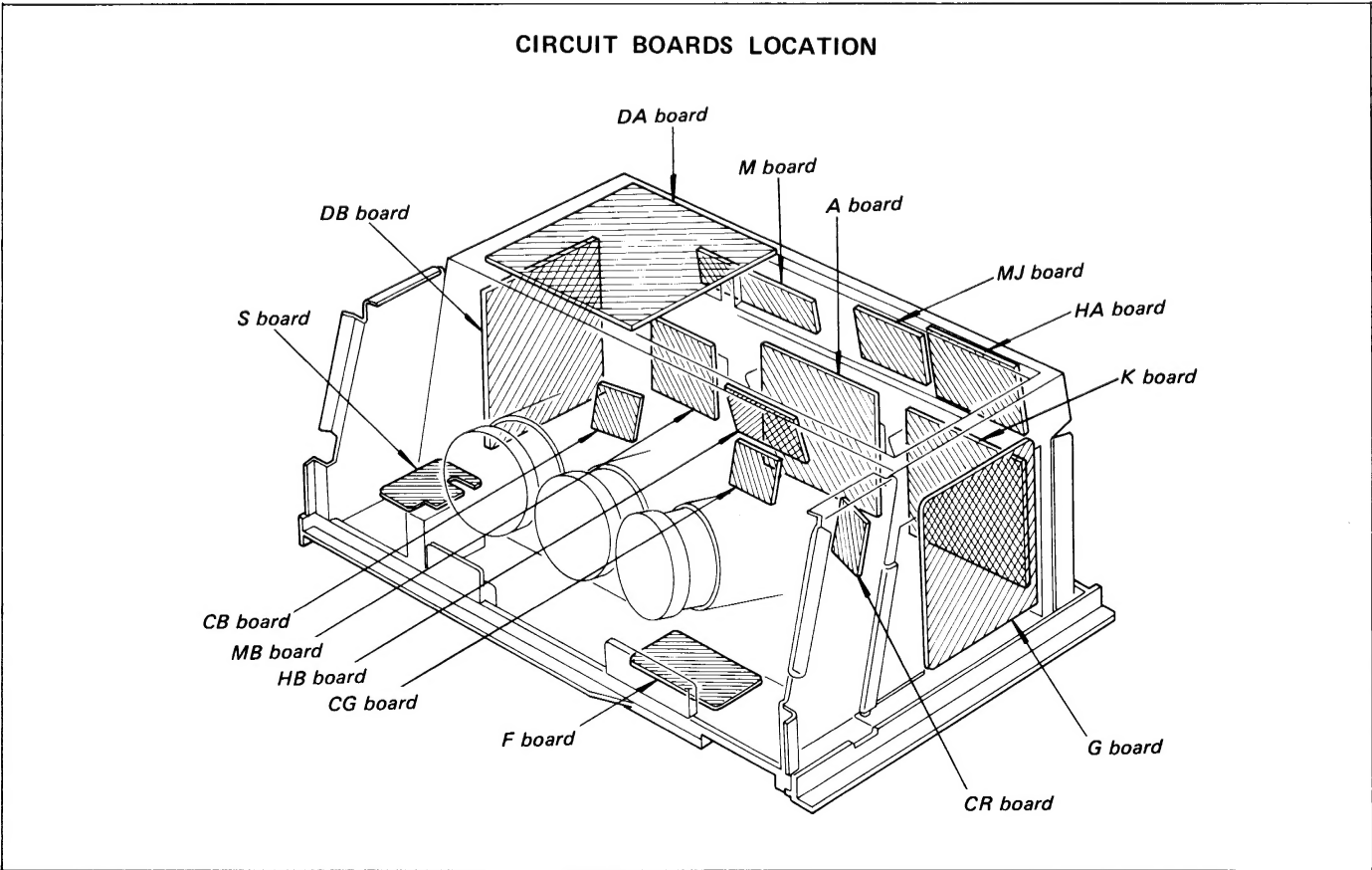


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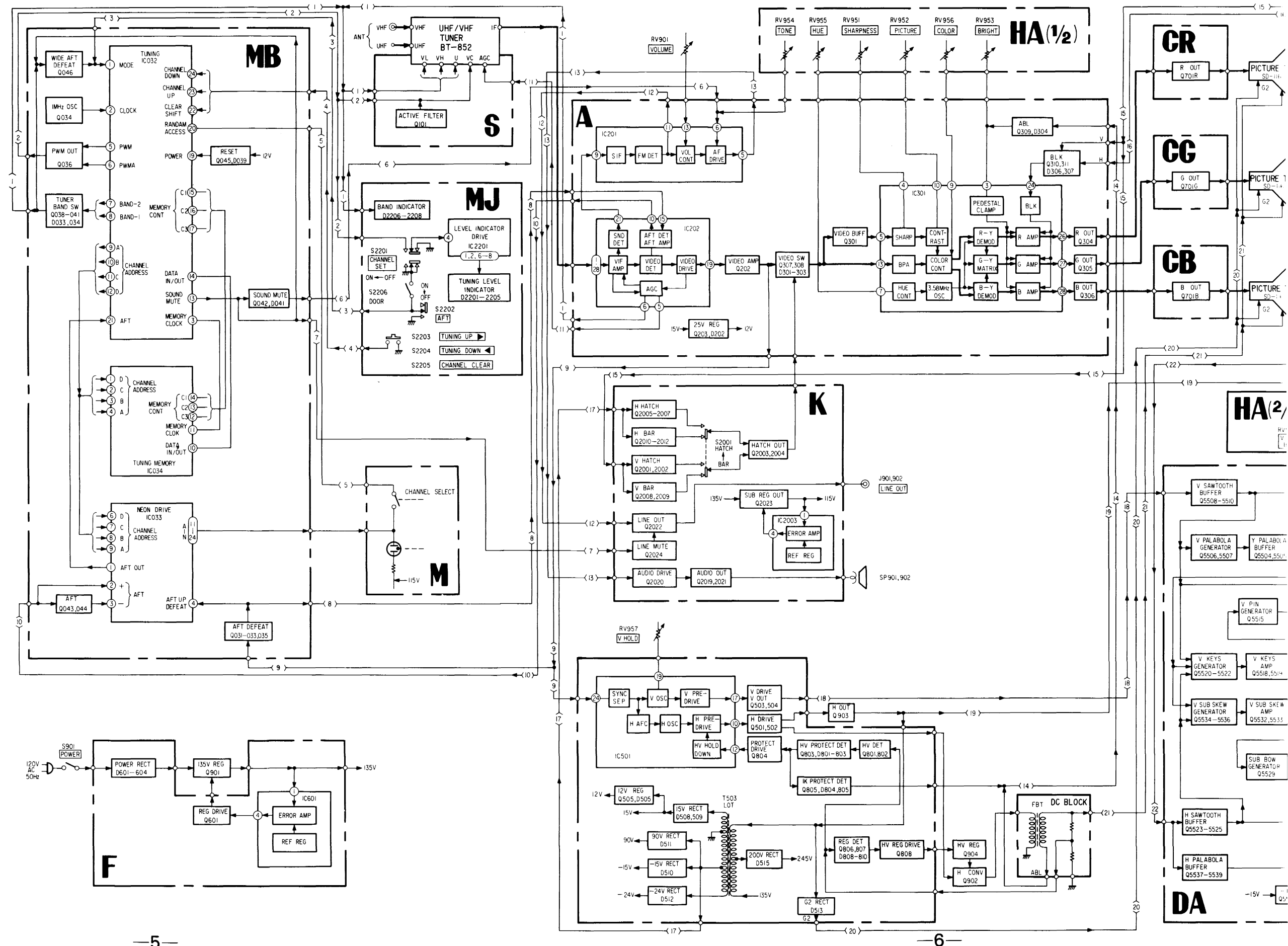
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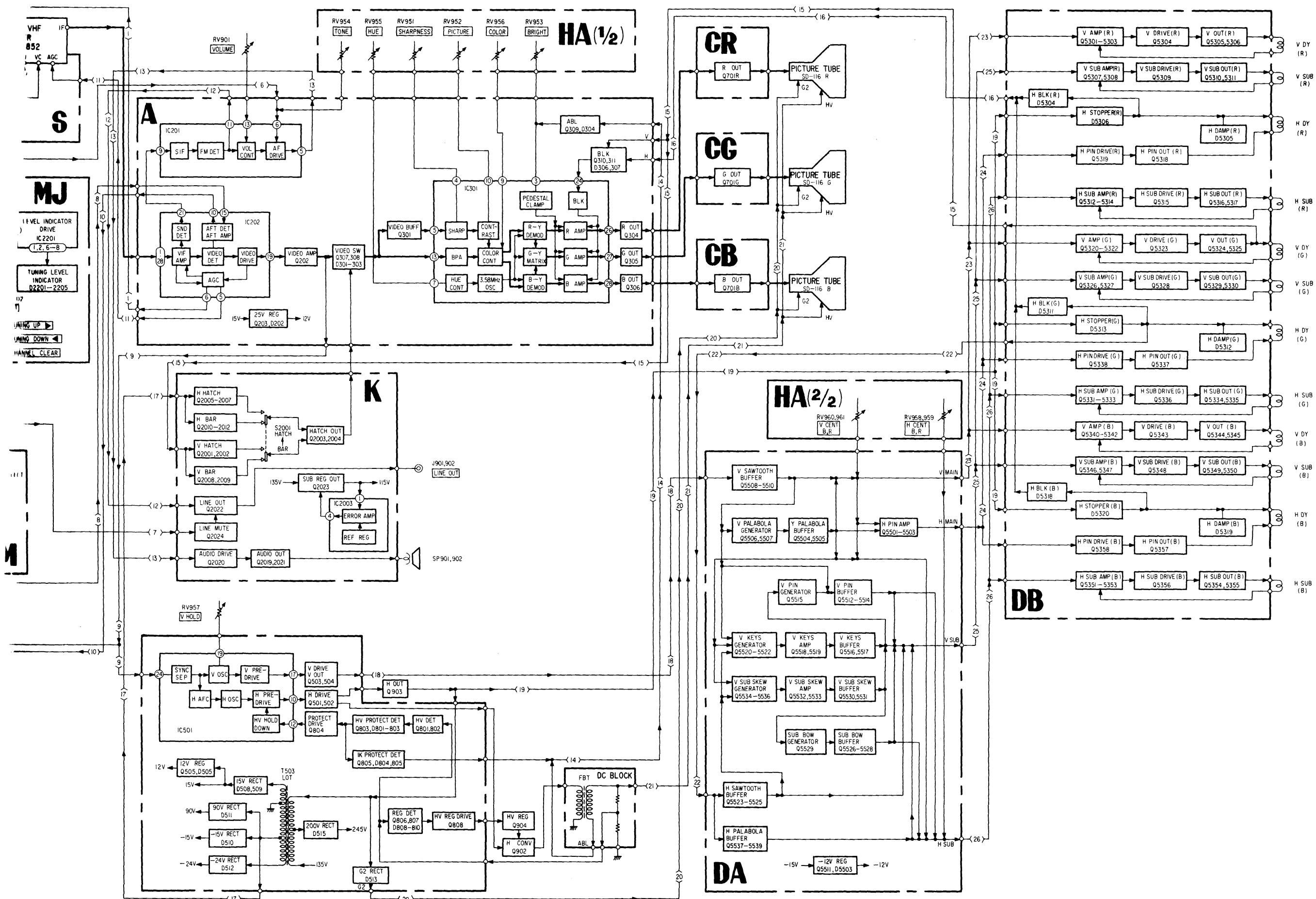




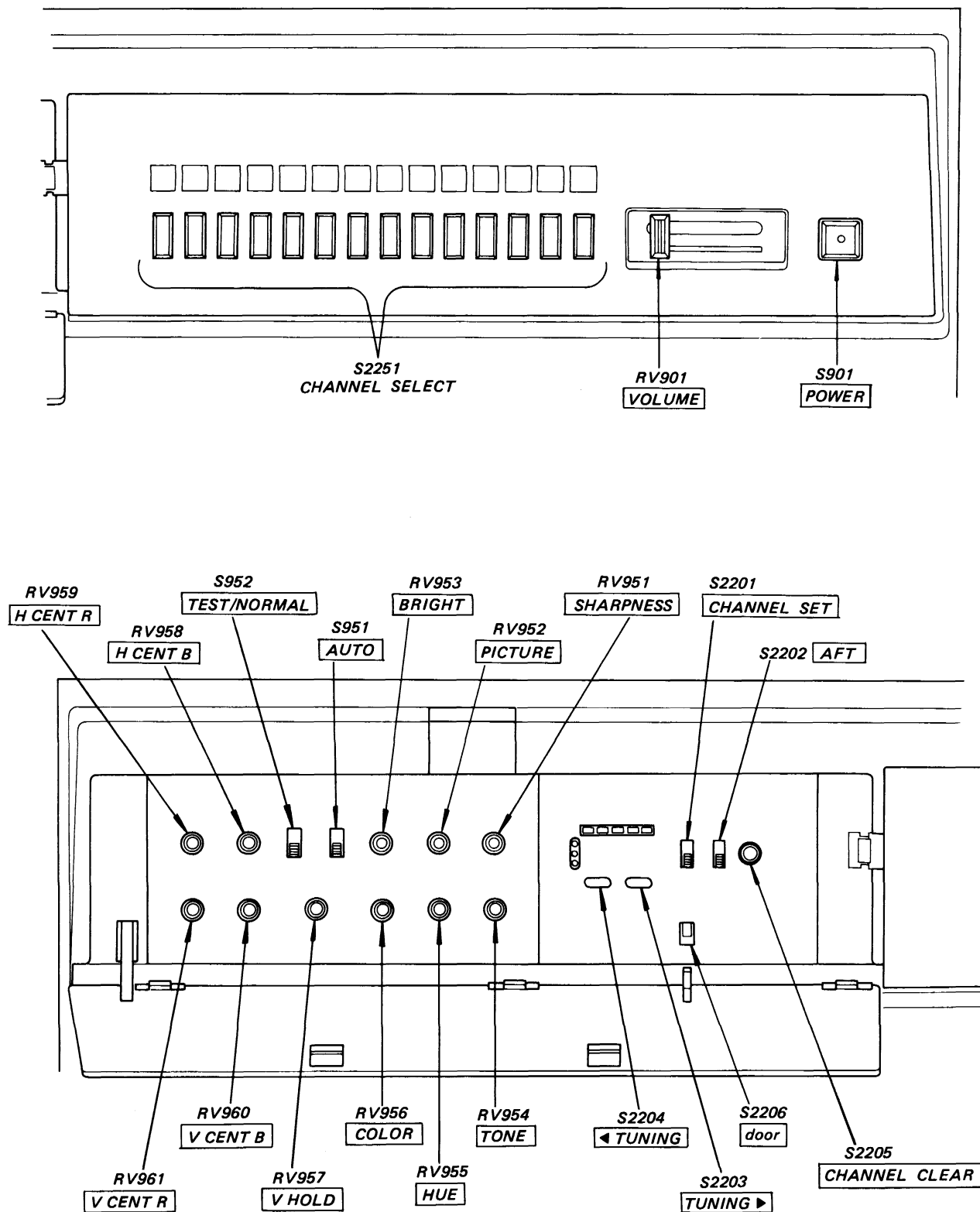
# SECTION 1 OUTLINE

## 1-1. BLOCK DIAGRAM

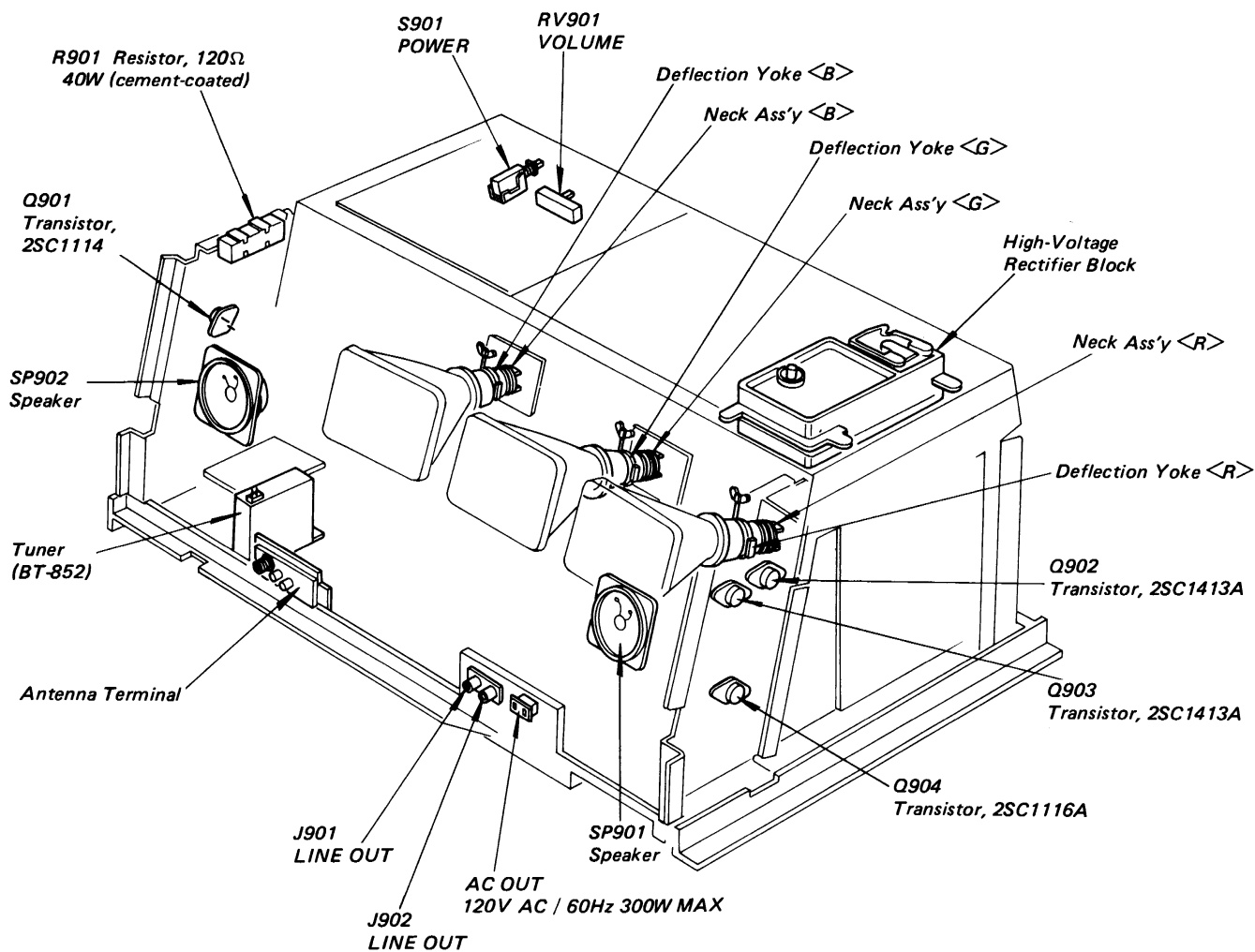




**1-2. CONTROL PANEL VIEW**



**1-3. INTERNAL VIEW**

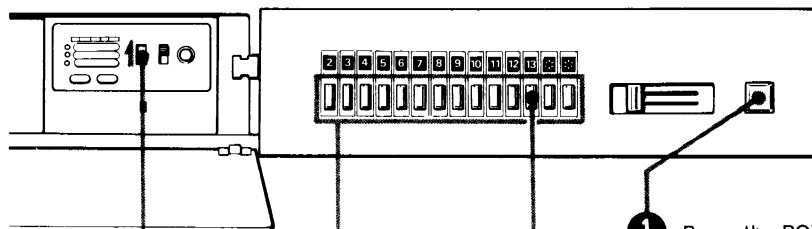


## 1-4. CHANNEL PRESETTING

### Ⓐ TO PRESET UHF CHANNELS ON THE PRESENTLY UNUSED POSITIONS

By using the factory preset 2–13 pushbuttons, you have been able to determine which VHF stations provide good reception. From the local newspaper, or your neighbors, or a TV set, you can determine which UHF stations provide satisfactory reception in your locality.

Open the front panel to expose the presetting controls



**1** Press the POWER Button, (the projector will turn on).

**2** Press the highest numbered VHF Channel-select Button (Normally channel 13). If no picture appears on the screen, press the next lower VHF Channel-select Button (12). If no picture appears, continue this procedure with the next lower VHF channel until a picture appears on the screen.

**3** Set the CHANNEL SET Switch to ON. (This switch must be ON for presetting stations, and it must be OFF for rechecking stations already preset).  
 • The position of the AFT Switch does not matter.

**4** Press the Channel-select Button that you wish to preset to receive a UHF station. (You may use the right-most two buttons marked with asterisks or any VHF position 2 – 13 that does not contain an active channel.)  
 • The Channel Indicator will illuminate and the station you have selected in step **2** will appear on the screen. (Disregard the number or asterisk indicated as this will be changed later.)

**Ex. UHF Channel 41**

**Tuning Indicator and Band Indicator Lamps**

The red lamp when lit shows you are in the Band including channels 2 through 6, the yellow lamp when lit shows you are in the band including channels 7 through 13, and the green lamp when lit shows you are in the band including channels 14 through 83. Within each of these bands, the multi-segment Tuning Indicator will show in what portion of the band you are tuned to at any given moment, with the left-most segment indicating the lowest frequency within each band, and the right-most segment indicating the highest frequency within each band.

- 5** Press the TUNING-up ► Button (do not hold the button in, just press it momentarily). Allow 1 or 2 seconds for the picture to stabilize.
  - In strong signal areas, tuning may sometimes stop between channels. If a station is not received, press the TUNING-up ► Button again.
- 6** Repeat steps **5** as required until your desired station appears on the screen. Use the Tuning Indicator and Band Indicator Lamps (explained above) as guides.

**STOP! (READ NOTE)**

**NOTE:** You have preset the desired UHF station on the Channel-select Button you have selected. If another UHF station is not available or you do not wish to continue presetting at this time, proceed to step **8**. If you wish to continue presetting other available UHF stations, proceed to step **7**.

- 7** Select another vacant channel by pressing the desired Channel-select Button; press TUNING-up ► Button, and allow picture to stabilize; continue this procedure until all desired UHF stations have been pre-selected (if problems are encountered refer to steps **4**, **5** and **6**).
- 8** Set the CHANNEL SET Switch to OFF and make sure the AFT Switch is now set to ON.

After the presetting has been completed, replace the Channel Indicating Segments to correspond to your presetting (see page 13) and close the front panel.

- If there is a VTR position to be included, refer to page 13.
- To use your projection system with a cable television system, contact a representative of the cable company for instructions regarding channel selection. In most cases, this adjustment will be made by the cable company at the time of installation.

## **② TO ARRANGE THE ACTIVE VHF AND UHF CHANNELS IN NUMERICAL SEQUENCE OR YOUR DESIRED SEQUENCE**

Any push button can be set to any frequency from below channel 2 to the highest UHF TV frequency.

- ① Make a list of your receivable VHF and UHF stations and list them as shown in the following example.  
VHF: Channels 2, 4, 5, 7, 9, 11 and 13  
UHF: Channels 21, 25, 31, 41 and 47
- ② Having made such a list, remove the Channel Indicator Sheet from the panel, and insert numbers to correspond to your list (instructions on changing numbers are on page 13). You are now ready to preset the Channel-select Button to correspond to your selection of stations.

Example



- ③ Press the POWER Button, (the projector will turn on).
- ④ Set the CHANNEL SET Switch to ON (This switch must be ON for presetting stations, and it must be OFF for rechecking stations already preset).
- ⑤ Press the Channel-select Button to be preset first. The station selected just before the CHANNEL SET Switch had been set to ON will appear on the screen (the channels may be preset in any order, however, it is more convenient to start with the lowest channel number and proceed to the highest channel number when channels are placed in ascending numerical order).  
● In our example above, we would start by pressing the Channel-select Button marked 4, since channel 2 has already been preset at the factory.

⑥ Using the Tuning Indicator and Band Indicator Lamps (explained in section ①), press the TUNING-up ► Button for locating higher numbered channels or the TUNING-down ◀ Button for locating lower numbered channels. (Do not hold the button in, just press it momentarily).

Allow 1 or 2 seconds for the picture to stabilize.

⑦ Repeat step ⑥, as required until your desired station is received.

● In strong signal areas, tuning may sometimes stop between channels. If your desired station cannot be received, press the TUNING Button again.

⑧ Press the next Channel-select Button to be preset and press the TUNING-up ► or TUNING-down ◀ Button as required to locate the next station.

● In our example we would now press the next Channel-select Button to the right (marked 5) and press the TUNING-up ► Button to receive the next higher station.

⑨ Repeat step ⑧ until all desired stations have been preset.

⑩ Set the CHANNEL SET Switch to OFF and make sure that the AFT Switch is now set to ON.

### **Alternative Tuning Method**

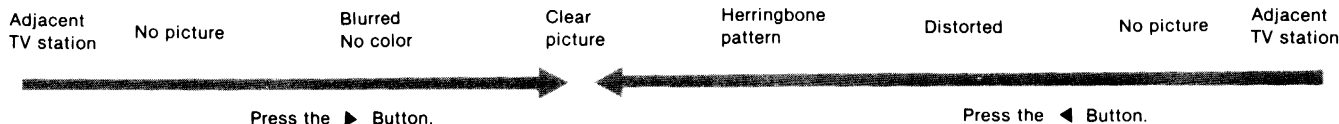
Before tuning in the desired station, you may use the CHANNEL CLEAR Button to erase any memory on the depressed Channel-select Button, and to position its tuning to a frequency below channel 2. Then use the TUNING-up ► Button as often as required to locate your desired station.

### **To fine-tune the channel manually**

In case of extreme interference, or of an extremely weak station, adjust the fine tuning manually as follows.

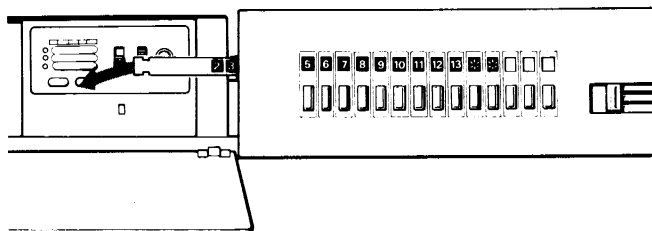
Check that the CHANNEL SET Switch is set to OFF, set the AFT Switch to OFF and keep the TUNING-up ► or TUNING-down ◀ Button depressed until a clear picture is obtained. Refer to the following chart.

When the fine tuning is completed, close the front panel with AFT Switch set to off.

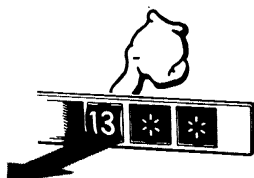


**To replace the number-indicating segment**

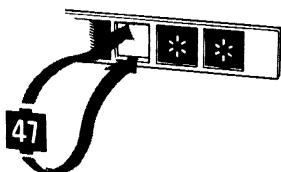
- ❶ Remove the Channel Indicator sheet.



- ❷ Press the segment out from the rear.



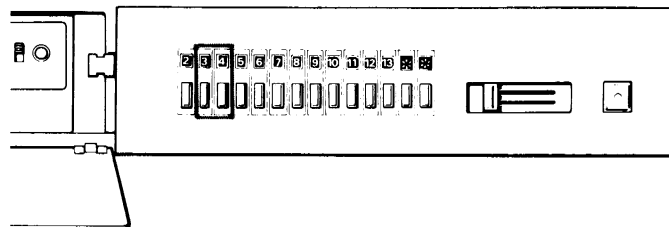
- ❸ Install the correct number segment.



- ❹ Replace the sheet in the original position.

**To preset for VTR playback**

At the factory, the second button from the left is preadjusted to VHF channel 3, and the third button to VHF channel 4. One of these channels, 3 or 4, is locally inactive and may be used to view the playback picture from a Sony Betamax videocassette recorder (or other VTR) equipped with an RF output terminal.



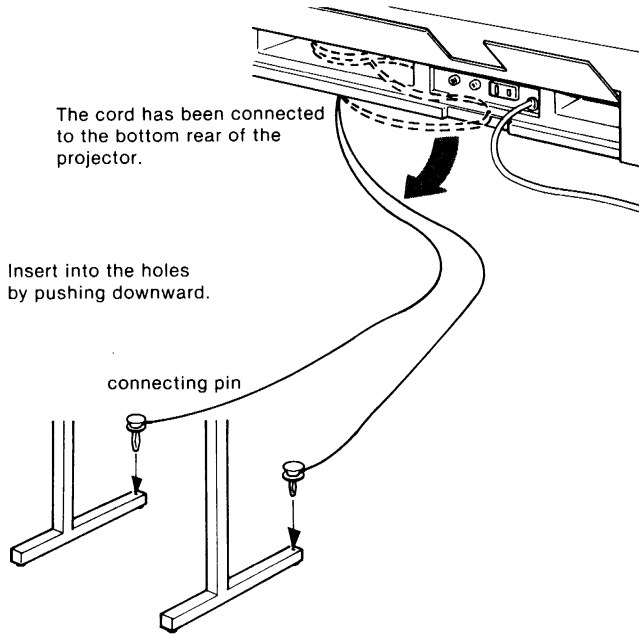
If you wish to preset some other position to receive the signals from the recorder, complete the connections and proceed as follows.

- ❶ Set the recorder to the playback mode.  
The signal from the recorder will be fed to the projector.
- ❷ Set the CHANNEL SET Switch to ON.
- ❸ Press the Channel-select Button to be preset for viewing the playback picture.
- ❹ Press the CHANNEL CLEAR Button.
- ❺ Press the TUNING-up ► Button until VHF channel 3 or 4 (the operating channel of the rf unit built into the recorder) is received, whereupon a clear picture will be obtained.
- ❻ Set the CHANNEL SET Switch to OFF.

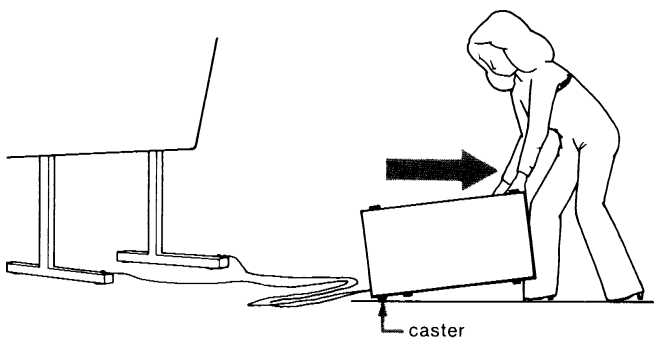


## 1-5. SETTING UP THE SYSTEM

- ❶ Take the Positioning Cord out of the Power Cord Container and connect both ends of the cord to the screen support feet.



- ❷ Move the projector until both sides of the cord are equally tensioned. When moving the projector, lift up the front side and roll it on the caster.

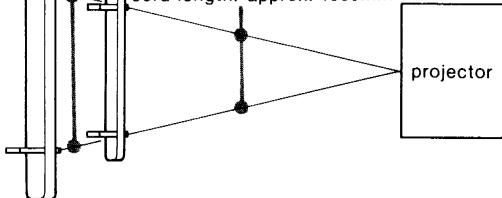


72-inch screen

cord length: approx. 2183mm

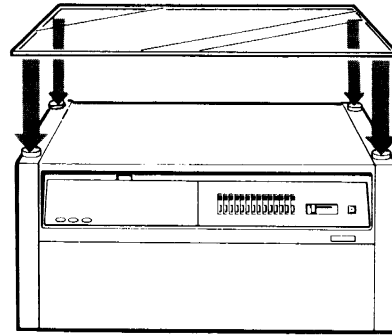
50-inch screen

cord length: approx. 1530mm



- ❸ Pull out the connecting pins to remove the Positioning Cord from the screen support feet. Store the Positioning Cord in the Accessory Container or the Power Cord Container.

- ❹ Put the Top Board (made of tempered glass) on the projector. The projector may thus be used as a center table.

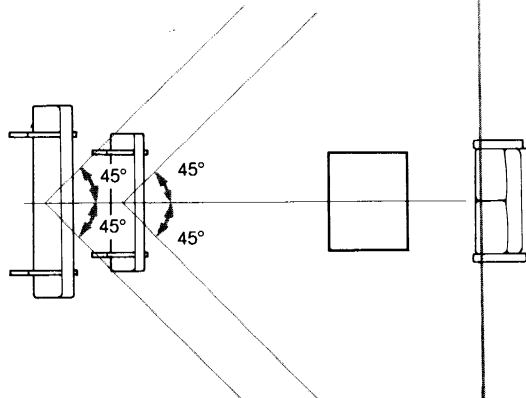
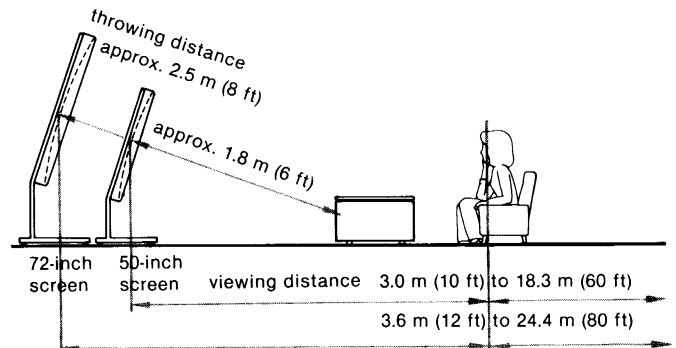


- ❺ Remove the Lens Cover.

### Note:

- The projector and the screen should be located on the same horizontal level. Avoid setting them on a slanting floor. When placing the projector or the screen on an uneven floor, turn counterclockwise the rubber feet on the bottom front of the projector or on the bottom of the screen supports until the set is level.
- The projector and the screen should be installed perpendicular to each other. (This can be checked in the following registration adjustments.)

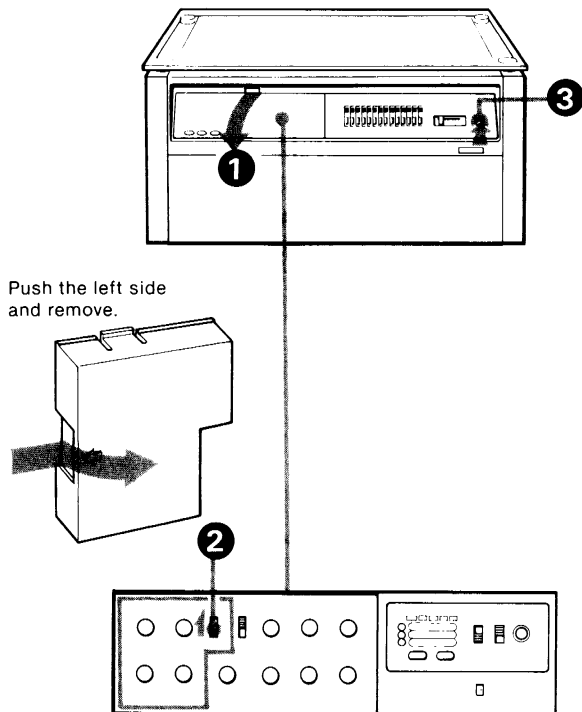
### Audience area



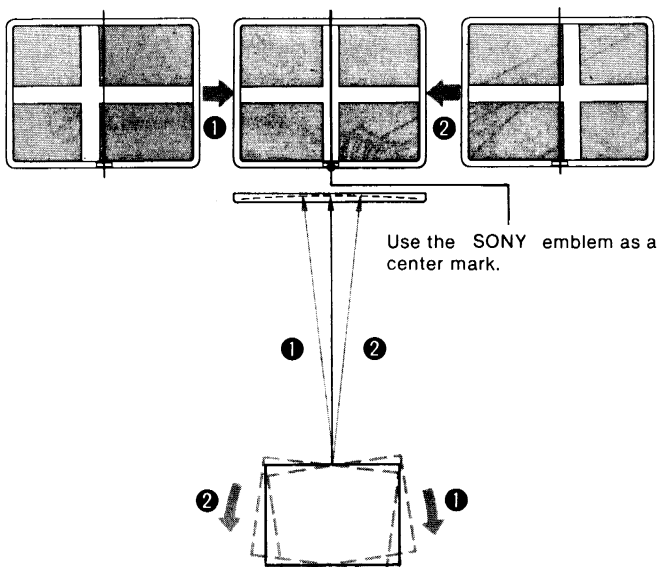
## 1-6. REGISTRATION ADJUSTMENT (CUSTOMER CONTROLS)

### Preparation

- ① Open the front panel and remove the cover to expose the controls.



- ② Set the TEST/NORMAL Switch to TEST.
- ③ Press the POWER Button to switch on the projector. A built-in test pattern will be displayed on the screen.
- ④ Check that the white vertical line is displayed at the horizontal center of the screen. If it is not, move the right or left side of the projector slightly to center the line (to install the projector perpendicular to the screen).



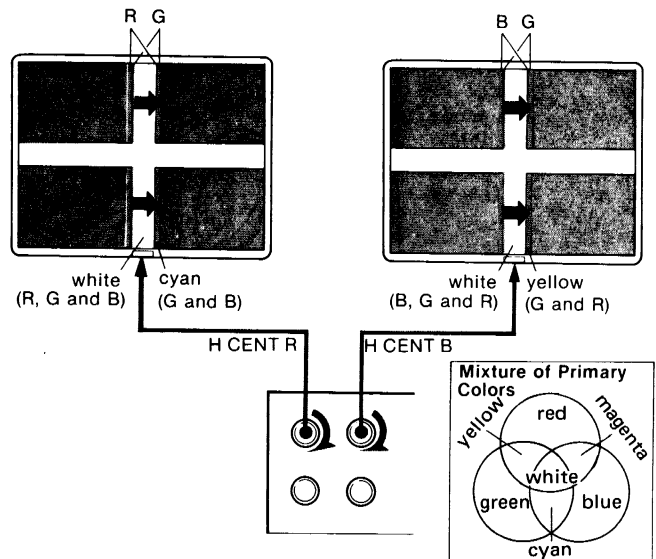
### Adjustment

After transporting the set from one place to another, the red, green and blue lines may not be superimposed (the cross may not be seen as white).

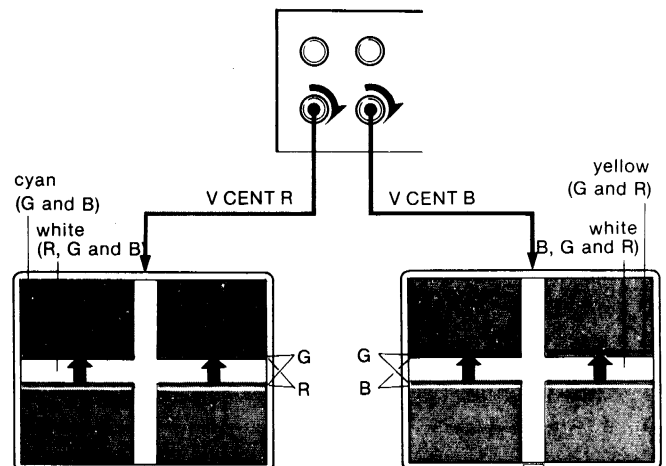
If this symptom is noticed, perform the registration adjustment yourself. Should the difficulty persist, contact your Sony dealer.

As you turn the controls clockwise, the lines move in the direction indicated in the illustrations. To move the lines in the opposite direction, turn the controls counterclockwise.

- ① Adjust the H CENT B and H CENT R Controls to converge the blue and red vertical lines with the green line.



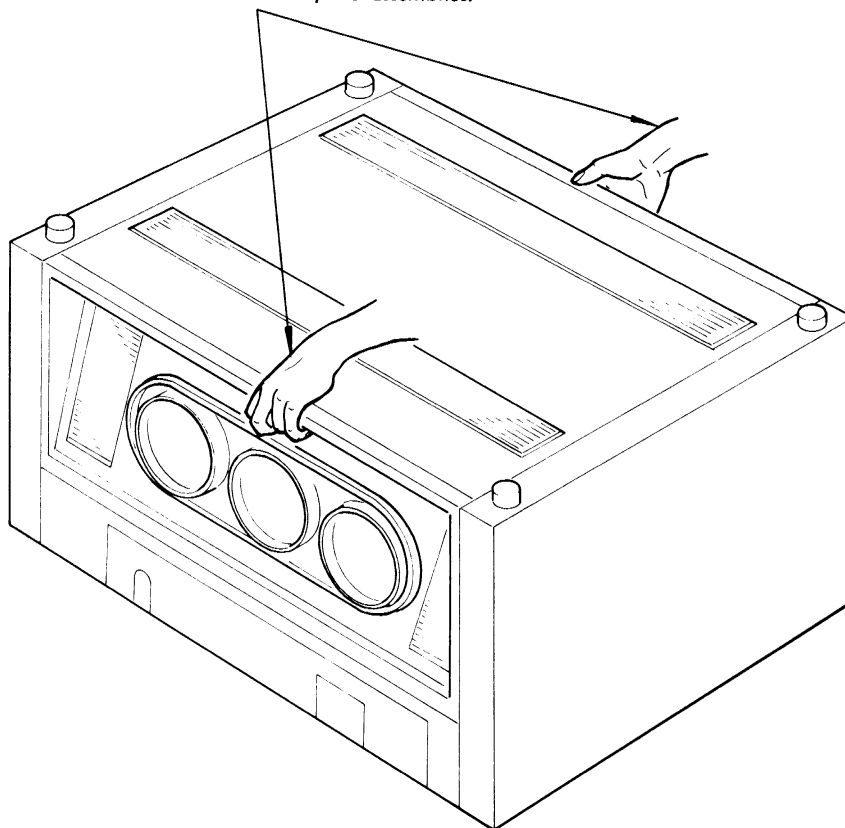
- ② Adjust the V CENT B and V CENT R Controls to converge the blue and red horizontal lines with the green line.



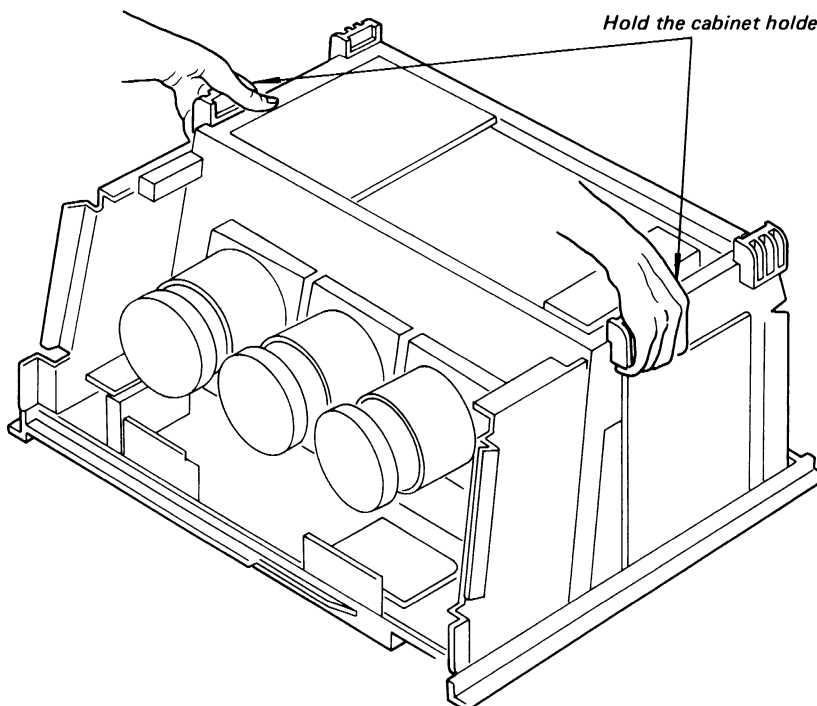
- ③ Repeat steps ① and ② until the cross appears white.
- ④ After the adjustment is completed, set the TEST/NORMAL Switch to NORMAL, replace the cover, and close the front panel.

**1-7. HOW TO CARRY**

*Hold the center of lens panel and control panel assemblies.*

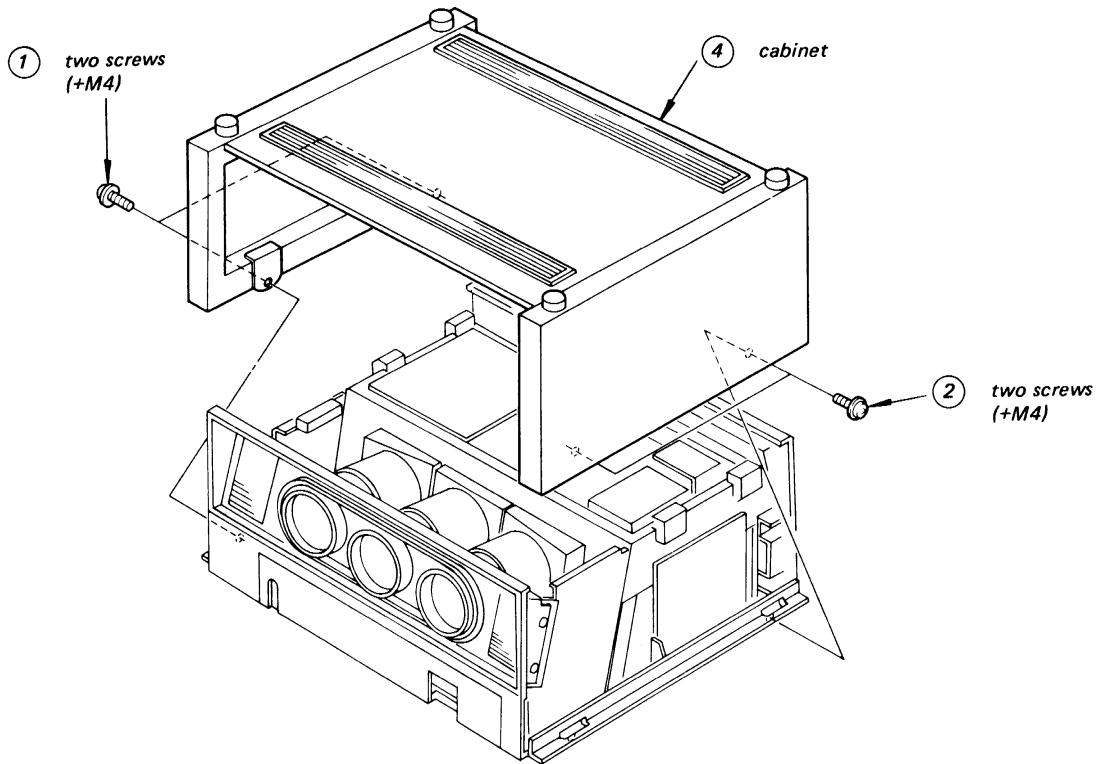


*Hold the cabinet holders.*

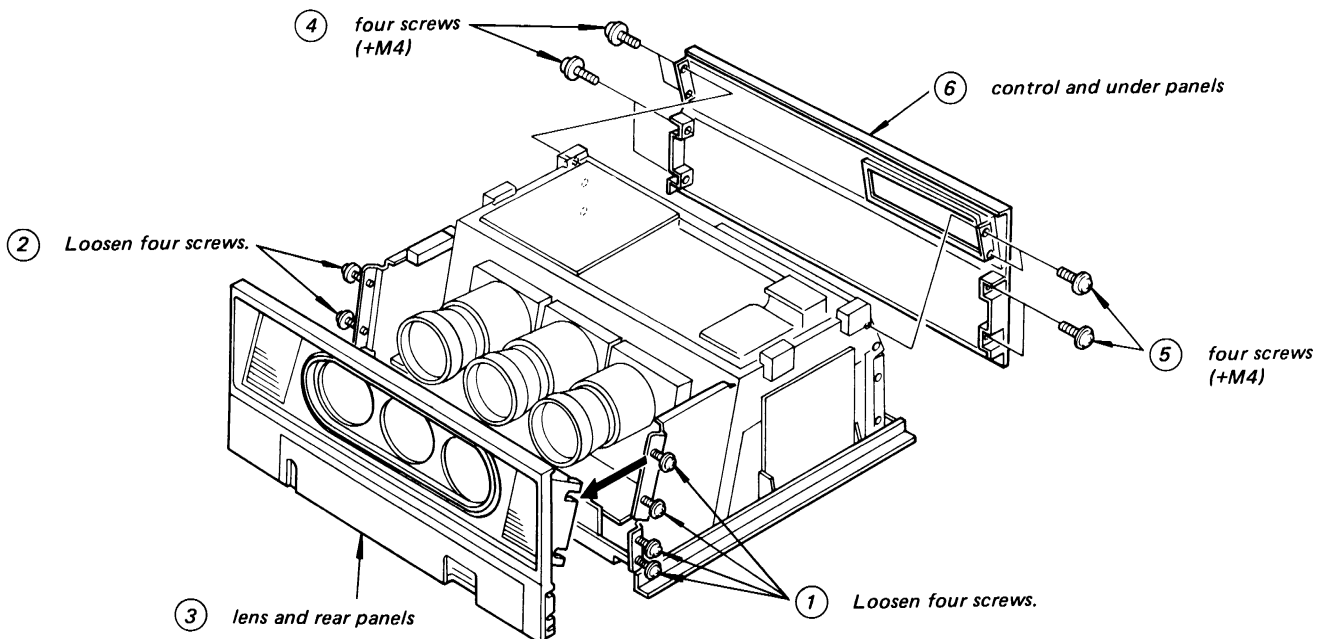


## SECTION 2 DISASSEMBLY

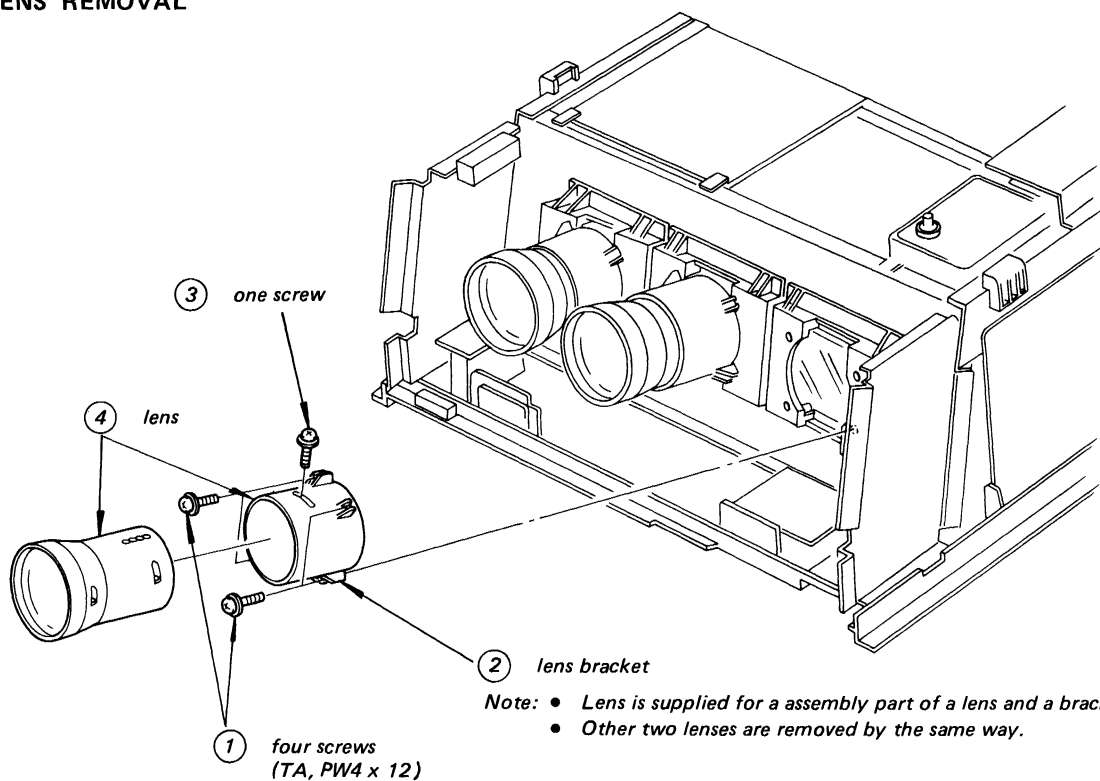
### 2-1. CABINET REMOVAL



### 2-2. PANEL REMOVAL

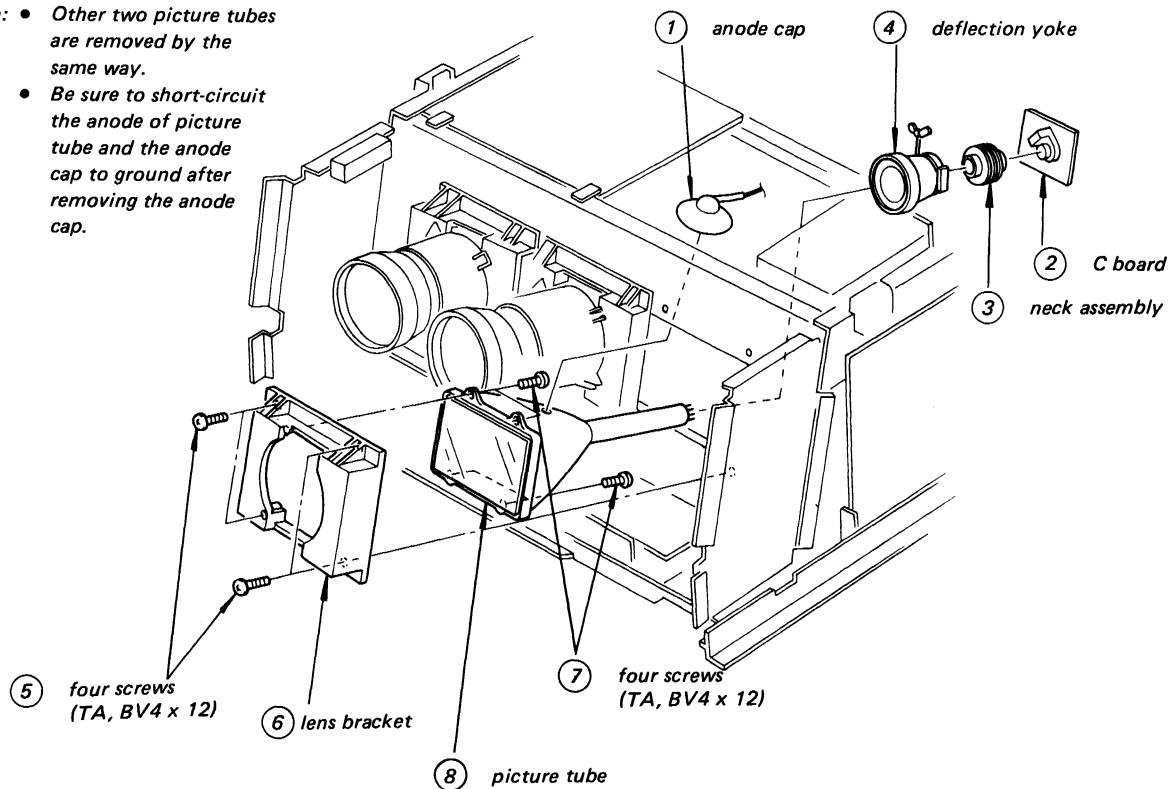


## 2-3. LENS REMOVAL



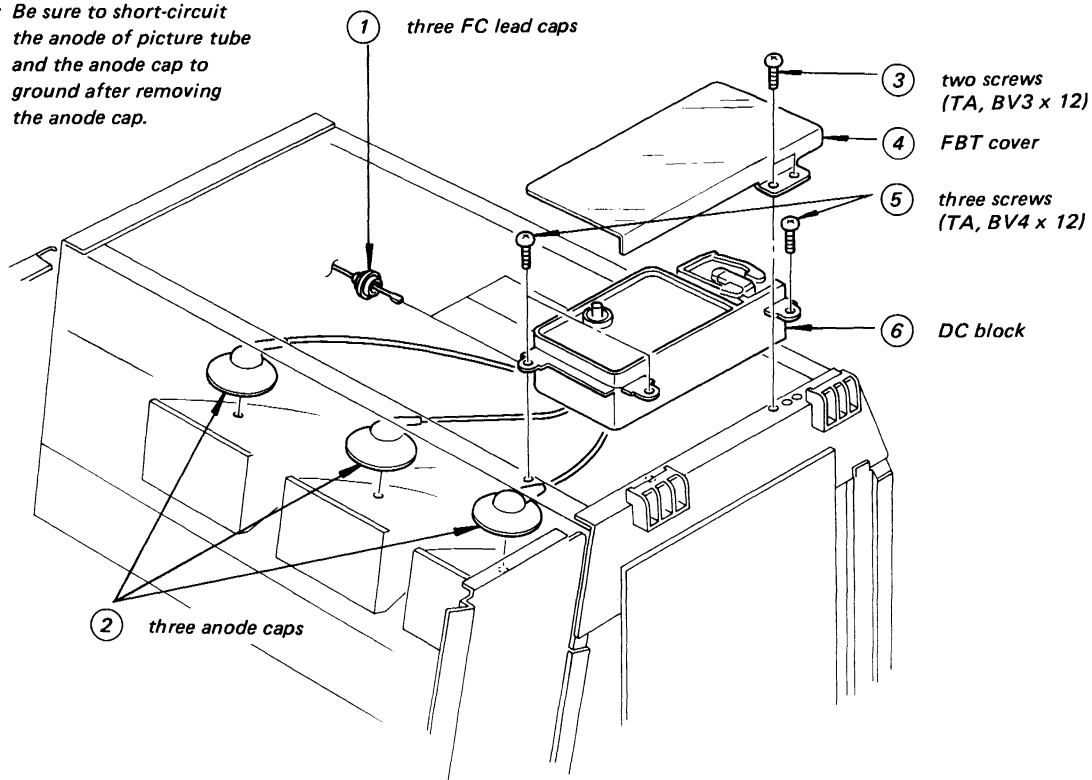
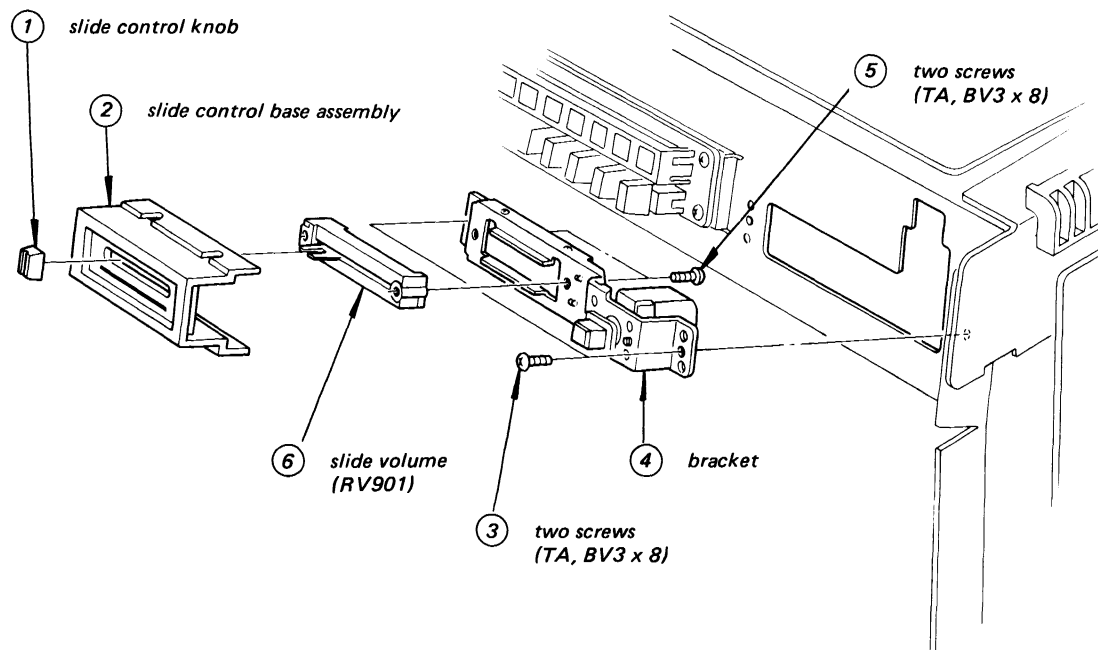
## 2-4. PICTURE TUBE REMOVAL

- Note: • Other two picture tubes are removed by the same way.  
• Be sure to short-circuit the anode of picture tube and the anode cap to ground after removing the anode cap.

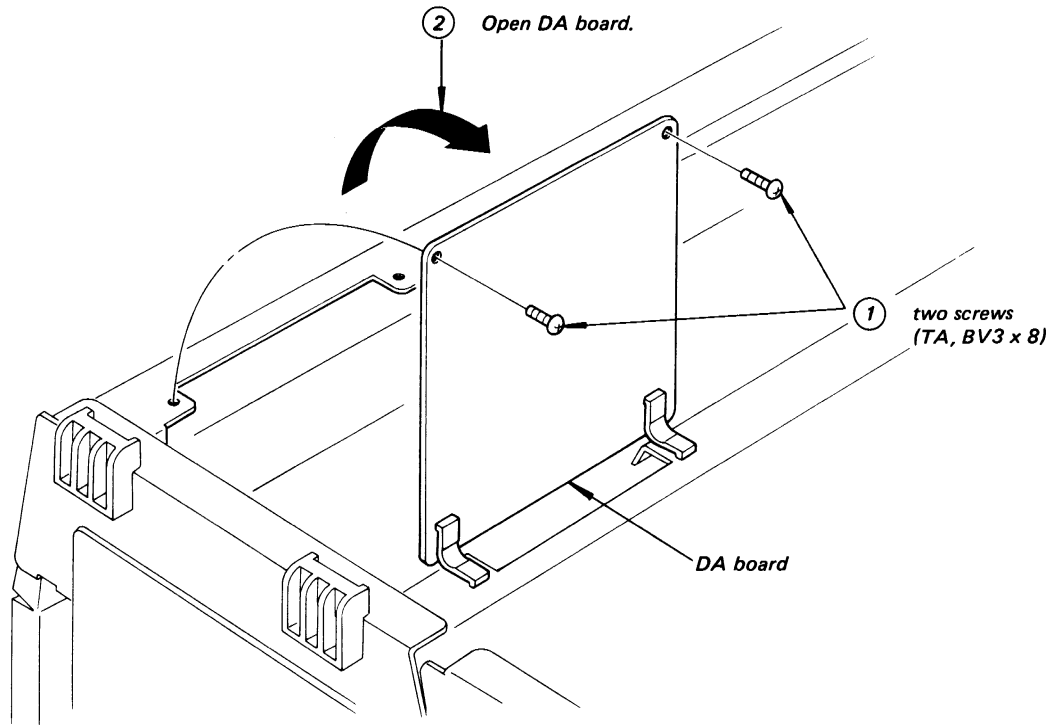


**2-5. DC BLOCK REMOVAL**

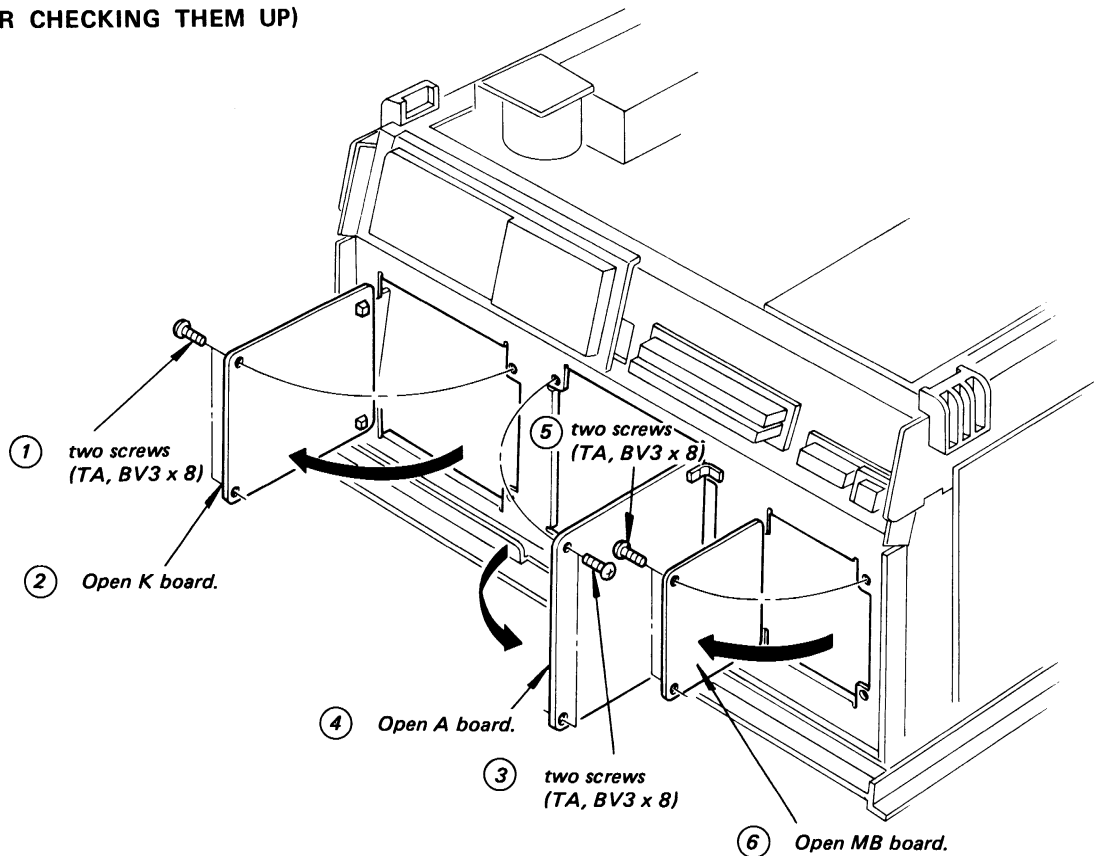
*Note: Be sure to short-circuit the anode of picture tube and the anode cap to ground after removing the anode cap.*

**2-6. SLIDE VOLUME REMOVAL**

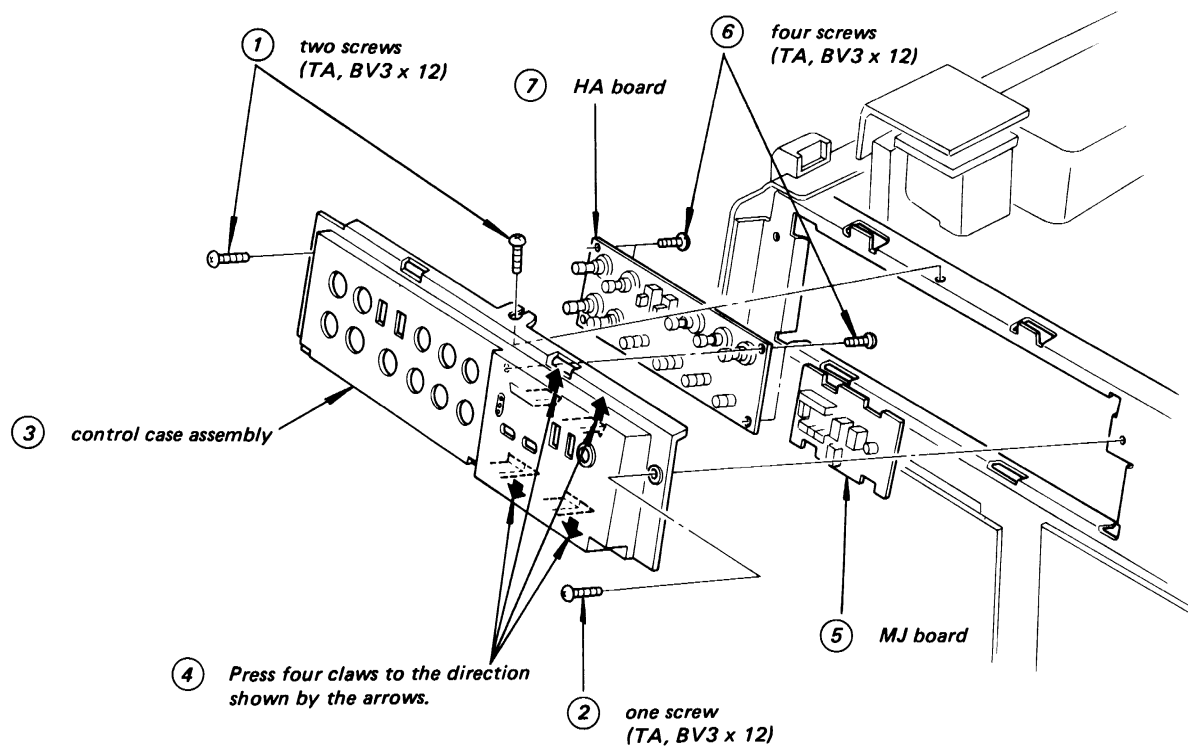
**2-7. DA BOARD REMOVAL  
(FOR CHECKING IT UP)**



**2-8. K, A AND MB BOARDS REMOVAL  
(FOR CHECKING THEM UP)**



## 2.9. HA AND MJ BOARDS REMOVAL (FOR CHECKING THEM UP)





## SECTION 3 SETUP ADJUSTMENTS

### 3.1. REGISTRATION ADJUSTMENT

#### 1. PREPARATION

- (1) Degauss the whole chassis.
- (2) Set the three deflection yoke and neck assemblies as shown in Fig. 3-1.

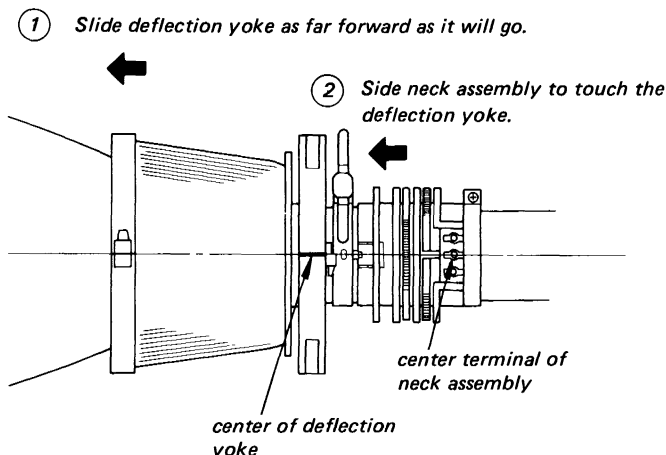


Fig. 3-1

- (3) Set the adjustable resistors on DA board to a mechanical center. Set the H and V CENT controls on the control panel to mechanical center.
- (4) Receive a off-air signal.
- (5) Switch and controls should be set as follows.  
 BRIGHT control } ..... fully clockwise  
 PICTURE control } ..... fully clockwise  
 TEST/NORMAL switch ... TEST position  
 HATCH/BAR switch ..... HATCH position
- (6) Set the projection unit and screen specified position on page 14.

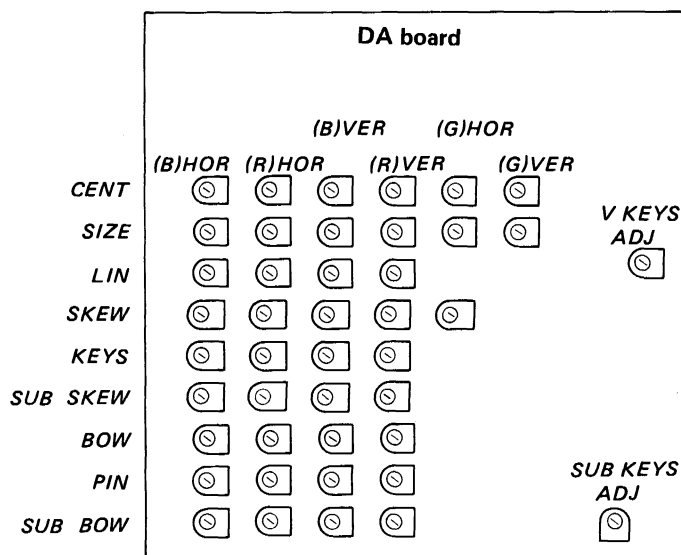


Fig. 3-2

### 2. FOCUS ADJUSTMENT

- (1) Cover the red and blue lenses with caps or equivalents.
- (2) Loosen the screw on the green lens as shown in Fig. 3-3.

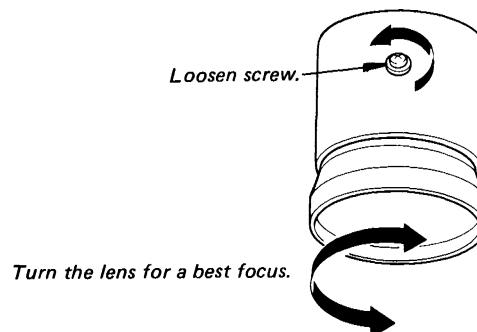


Fig. 3-3

- (3) Turn the green lens to obtain a best focus.
- (4) Adjust the focus control for a best focus as shown in Fig. 3-4.

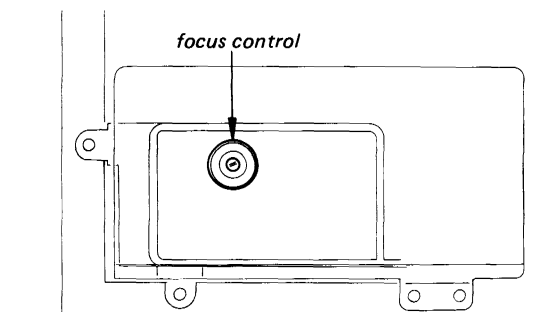


Fig. 3-4

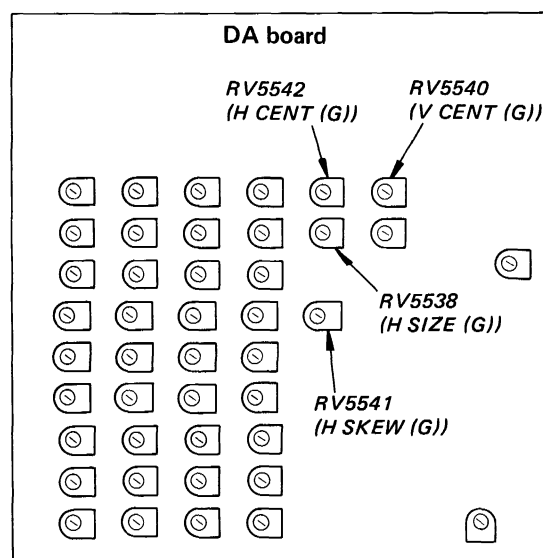


Fig. 3-5

- (5) Repeat steps (3) and (4) several times.
- (6) Tighten the screw on the green lens in position.
- (7) Remove the cap on the red lens and cover the green lens with a cap or equivalent.
- (8) Loosen the screw and turn the red lens for a best focus.
- (9) Tighten the screw on the red lens in position.
- (10) Remove the cap on the blue lens and cover the red lens with a cap or equivalent.
- (11) Loosen the screw and turn the blue lens for a best focus.
- (12) Tighten the screw on the blue lens in position.
- (13) Remove the caps.

### 3. GREEN PICTURE ADJUSTMENT

- (1) Cover the red and blue lenses with caps equivalents.
- (2) Adjust RV5542 (H CENT (G)) and RV5540 (V CENT (G)) to center the picture.
- (3) Rotate the green deflection yoke to make the horizontal center line of cross-hatch pattern horizontal as shown in Fig. 3-6.

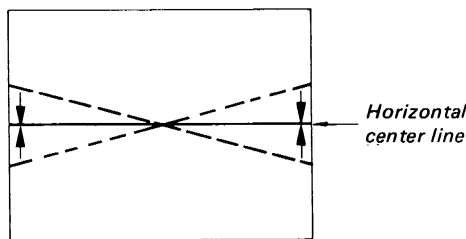


Fig. 3-6

- (4) Tighten the deflection yoke screw in position.
- (5) Position the green neck assembly as shown in Fig. 3-1. and tighten the neck assembly screw in position.
- (6) Adjust RV5541 (H SKEW (G)) to make the vertical center line of cross-hatch pattern vertical as shown in Fig. 3-7.

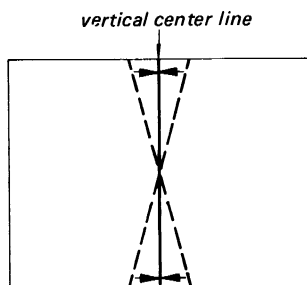


Fig. 3-7

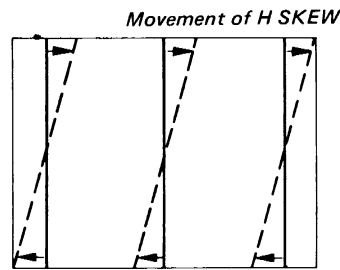


Fig. 3-8

- (7) Set the TEST/NORMAL switch to NORMAL position and project an off-air signal.
- (8) Adjust RV5538 (H SIZE (G)) so that the horizontal picture size is a little less than the screen size.
- (9) Adjust RV5542 (H CENT (G)) so that "a" is equal to "b" as shown in Fig. 3-9.

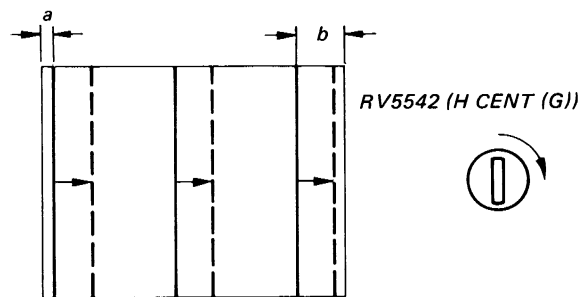


Fig. 3-9

- (10) Adjust RV5538 (H SIZE (G)) so that the horizontal picture size is as shown in Fig. 3-10.

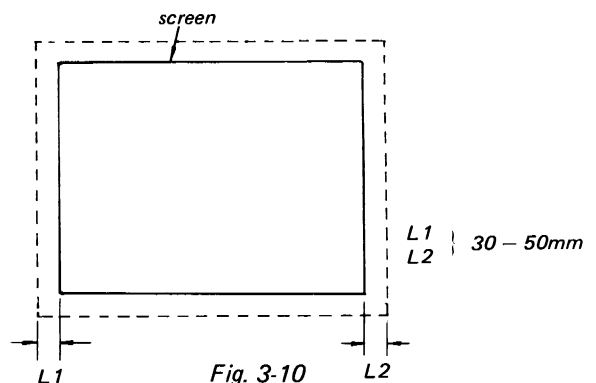


Fig. 3-10

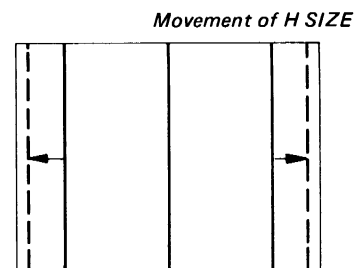


Fig. 3-11

- (11) If necessary, adjust RV5542 (H CENT (G)) finely.
- (12) Adjust RV5539 (V SIZE (G)) so that the vertical picture size is a little less than the screen size.
- (13) Adjust RV5540 (V CENT (G)) so that "a" is equal to "b" as shown in Fig. 3-12.

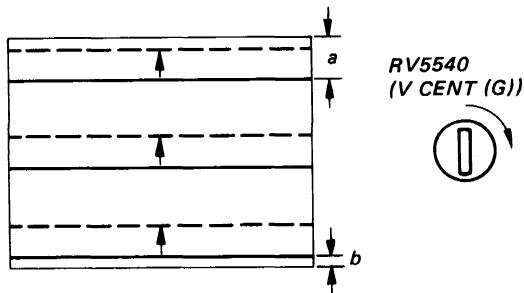


Fig. 3-12

- (14) Adjust RV5539 (V SIZE (G)) so that the vertical picture size is as shown in Fig. 3-13.

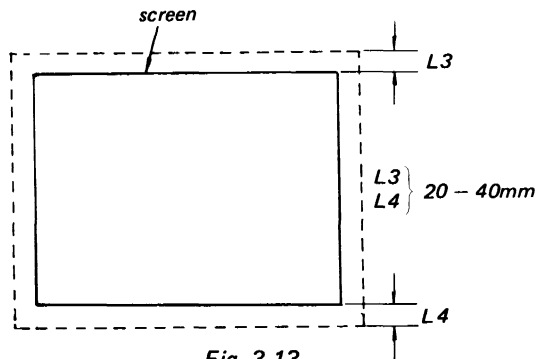


Fig. 3-13

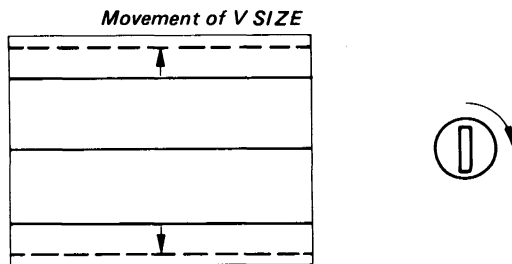


Fig. 3-14

- (15) If necessary, adjust RV5540 (V CENT (G)) finely.

**Note:** After this adjustment, do not touch RV5538 through RV5542 (H SIZE (G), V SIZE (G), V CENT (G), H SKEW (G) and H CENT (G)).

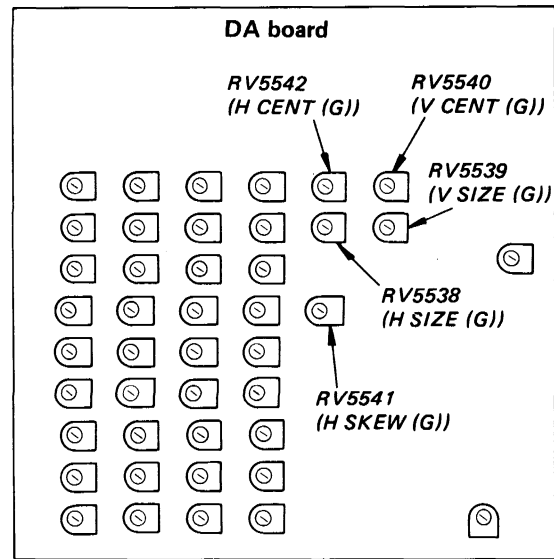


Fig. 3-15

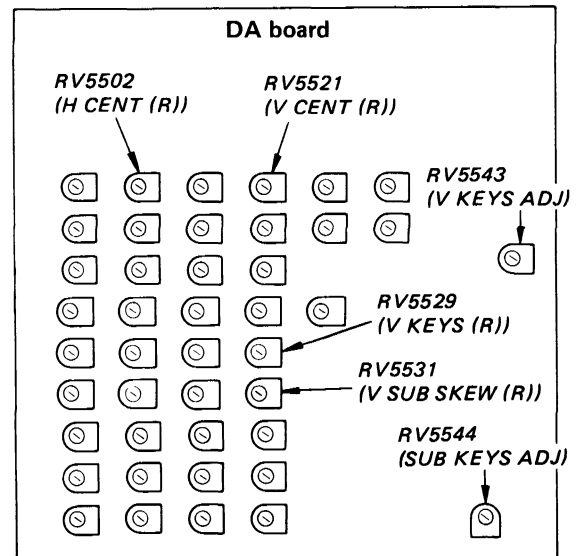


Fig. 3-16

#### 4. PREPARATION OF RED AND GREEN PICTURES ADJUSTMENT

- (1) Set the TEST/NORMAL switch to TEST.
- (2) Rotate the red deflection yoke so that the red horizontal center line is parallel with the green horizontal center line (Fig. 3-17).

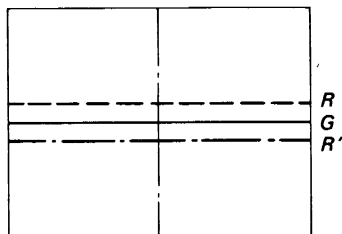


Fig. 3-17

- (3) Position the red neck assembly as shown in Fig. 3-18.

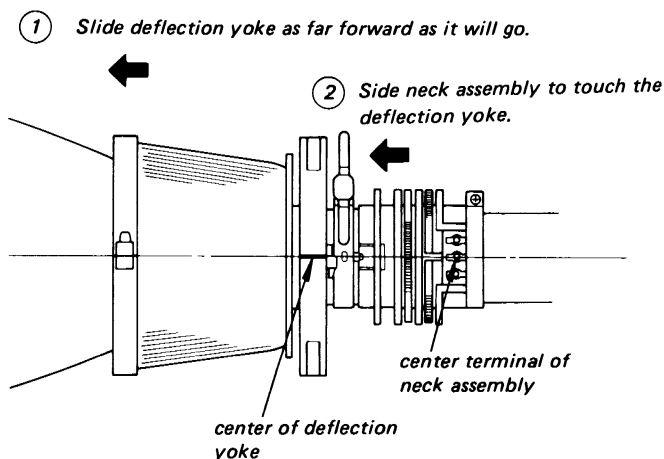


Fig. 3-18

- (4) Adjust RV5521 (V CENT (R)) to approach the red horizontal center line to the green horizontal center line properly for easier adjustment.
- (5) Adjust RV5502 (H CENT (R)) to approach the red vertical center line to the green vertical center line properly for easier adjustment.
- (6) Adjust RV5543 (V KEYS ADJ) so that the red horizontal center line does not move upward or downward to turn RV5529 (V KEYS (R)). (Fig. 3-19)
- (7) Adjust RV5544 (SUB KEYS ADJ) so that the red horizontal center line does not rotate to turn RV5531 (V SUB SKEW (R)). (Fig. 3-20)

**Note:** After this adjustment, do not touch RV5543 and RV5544.

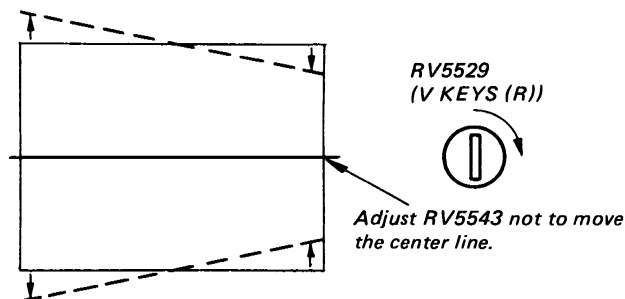


Fig. 3-19

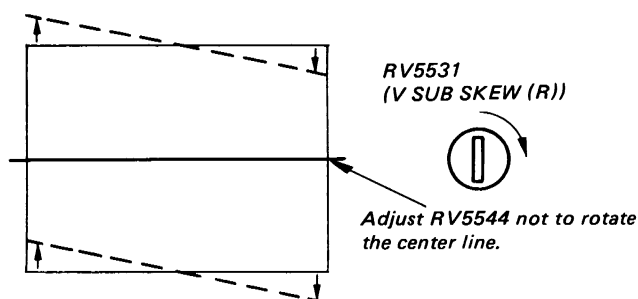


Fig. 3-20

- (8) Adjust RV5529 (V KEYS (R)) so that the red horizontal lines are parallel with the green horizontal lines on the upper and lower sides screen (Fig. 3-21).

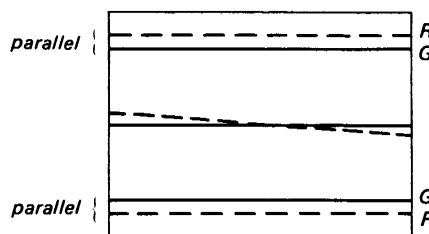


Fig. 3-21

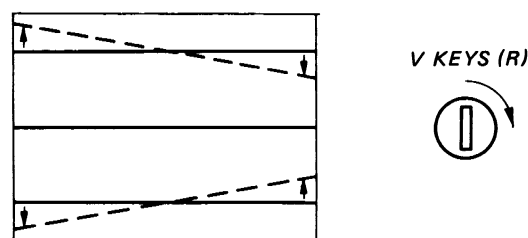


Fig. 3-22

- (9) Adjust RV5508 (H SKEW (R)) so that the red vertical center line is parallel with the green vertical center line (Fig. 3-23).

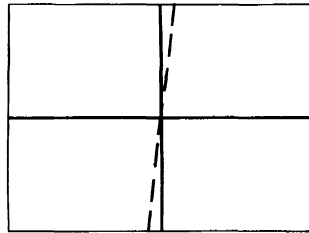


Fig. 3-23

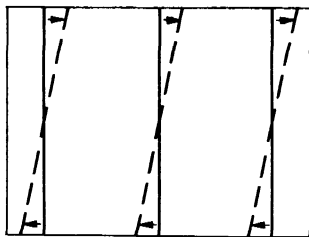


Fig. 3-24

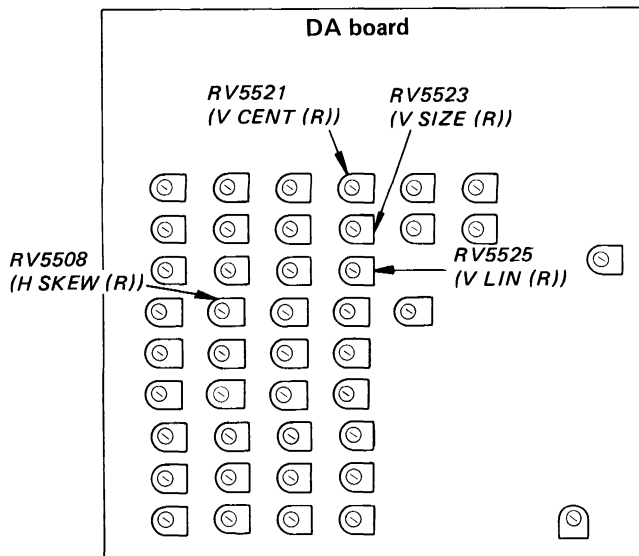


Fig. 3-25

## 5. VERTICAL ADJUSTMENT OF RED AND GREEN PICTURE

- (1) Set the TEST/NORMAL switch to TEST.
- (2) Rotate the red deflection yoke so that the red horizontal center line coincide with the green horizontal center line or the left and right spaces are equal as shown in Fig. 3-26.

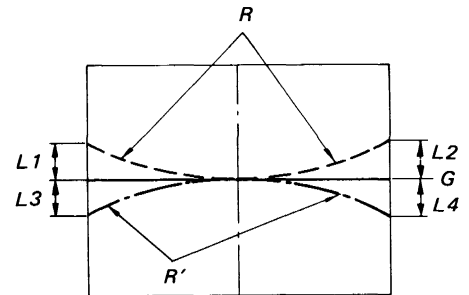


Fig. 3-26

- (3) Tighten the red deflection yoke screw in position.
- (4) Position the red neck assembly as shown in Fig. 3-27, and tighten the neck assembly screw in position.

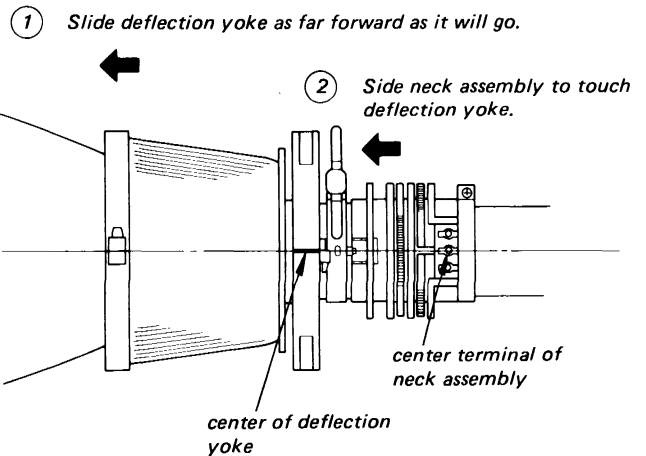


Fig. 3-27

- (5) Adjust RV5523 (V SIZE (R)) so that the red horizontal lines coincide with the green horizontal lines or "L1" is equal to "L2" in the middle screen as shown in Fig. 3-28.

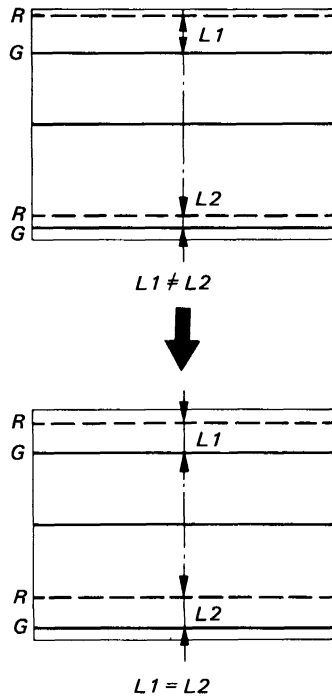


Fig. 3-28

- (6) Adjust RV5525 (V LIN (R)) so that "L1", "L2" and "L3" are equal in the middle screen as shown in Fig. 3-29.

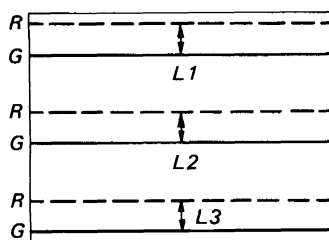


Fig. 3-29

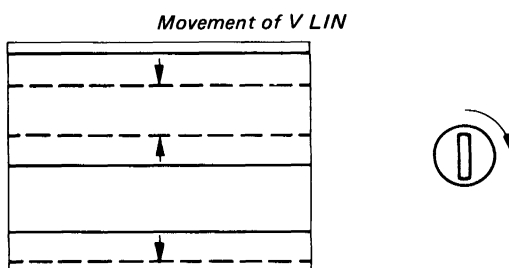


Fig. 3-30

- (7) Adjust RV5521 (V CENT (R)) to converge the red horizontal lines and the green horizontal lines in the middle screen as shown in Fig. 3-31.

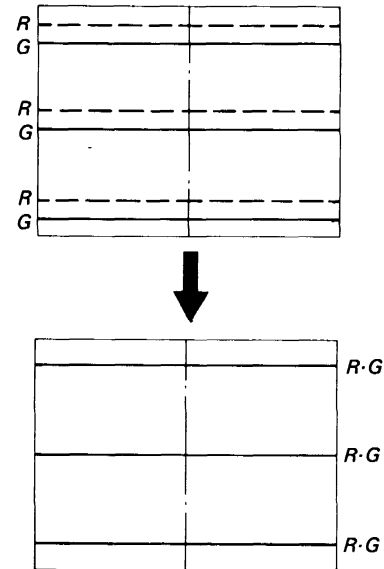


Fig. 3-31

Movement of V CENT (R)

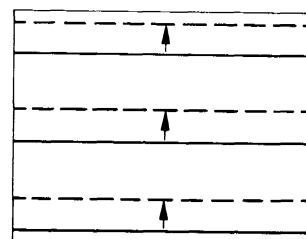
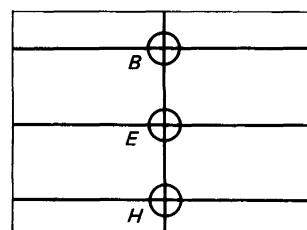


Fig. 3-32

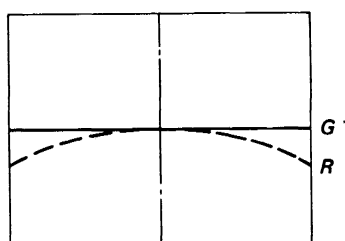
- (8) When the red horizontal lines do not coincide with the green horizontal lines as shown in Fig. 3-33, repeat above steps (5) through (7).



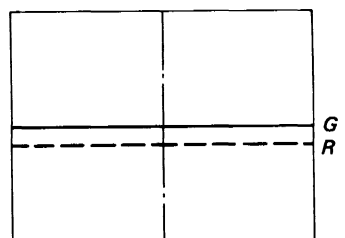
Red lines coincide with green lines at points B, E and H.

Fig. 3-33

- (9) Adjust RV5533 (V BOW (R)) so that the red horizontal center line is parallel with the green horizontal center line.
- (10) Adjust RV5521 (V CENT (R)) so that the red horizontal center line coincide with the green horizontal center line at the center of the screen (Fig. 3-35).



↓ Adjust RV5533  
(V BOW (R)).



↓ Adjust  
RV5521 (V CENT (R)).

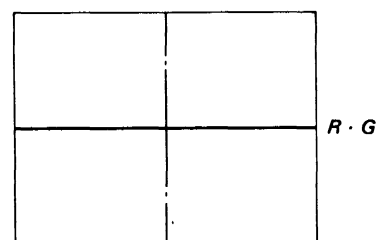


Fig. 3-34

- (11) When the red horizontal center line slants, adjust RV5527 (V SKEW (R)) (Fig. 3-35).

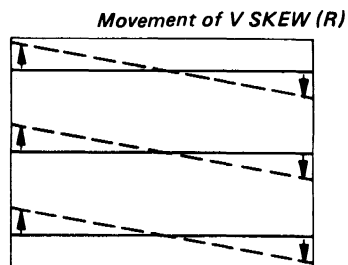


Fig. 3-35

- (12) When the red horizontal center line does not coincide with the green horizontal center line as shown in Fig. 3-36, repeat above steps (9) through (11).

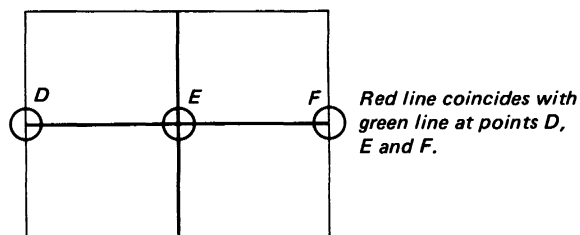


Fig. 3-36

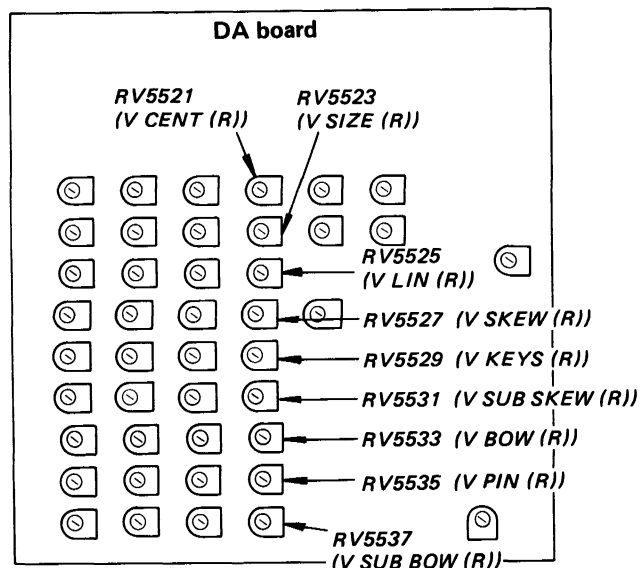


Fig. 3-37

- (13) Adjust RV5529 (V KEYS (R)) so that the upper side and lower side red horizontal lines are parallel (Fig. 3-38).

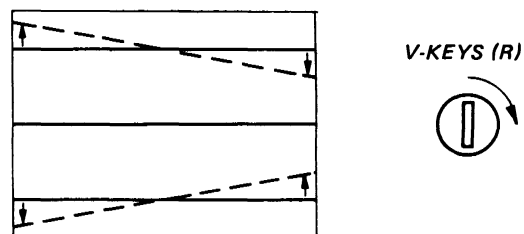


Fig. 3-38

- (14) Adjust RV5527 (V SKEW (R)) so that the red horizontal center line coincide with the green horizontal center line (Fig. 3-36).

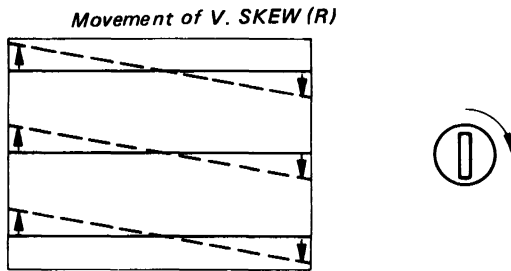


Fig. 3-39

*Movement of V PIN (R)*

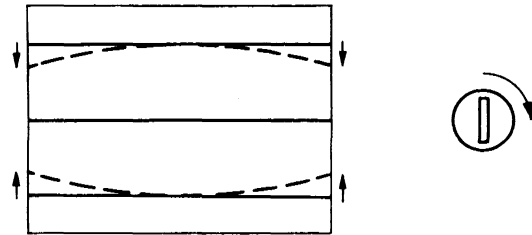


Fig. 3-43

- (15) Adjust RV5531 (V SUB SKEW (R)) so that "L1" ("L3") is equal to "L2" ("L4") as shown in Fig. 3-40.

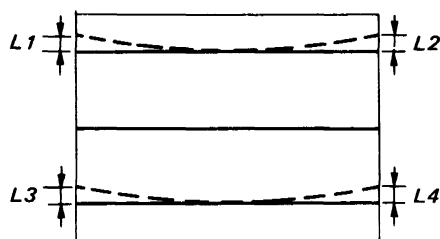


Fig. 3-40

- (18) Adjust RV5537 (V SUB BOW (R)) finely so that the red horizontal lines coincide with the green horizontal lines as shown in Fig. 3-44.
- (19) When the mis-registration appears on the screen, perform the necessary adjustment finely.

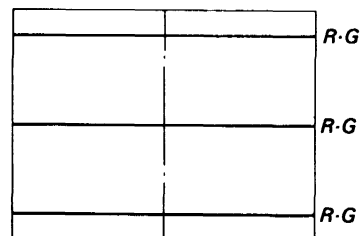


Fig. 3-44

*Movement of V SUB SKEW (R)*

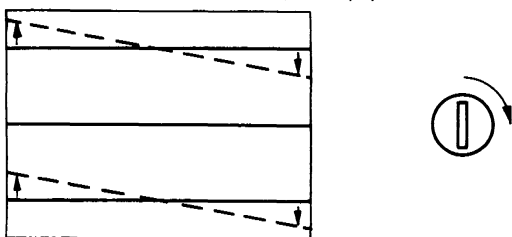


Fig. 3-41

*Movement of V SUB BOW (R)*

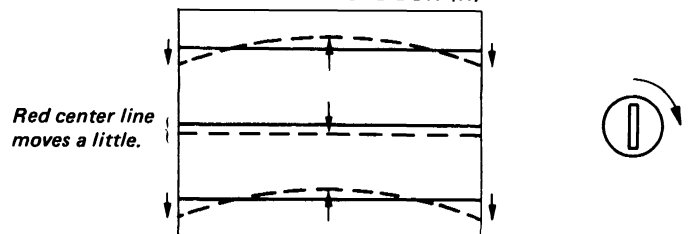
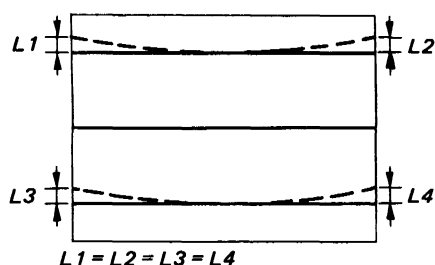


Fig. 3-45

- (16) If necessary, repeat above steps (13) through (15).

- (17) Adjust RV5535 (V PIN (R)) so that "L1", "L2", "L3" and "L4" are equal as shown in Fig. 3-42.



$$L1 = L2 = L3 = L4$$

Fig. 3-42



## 6. HORIZONTAL ADJUSTMENT OF RED AND GREEN PICTURES

- (1) Set the HATCH switch to TEST.
- (2) Adjust RV5508 (H SKEW (R)) so that the red vertical center line is parallel with the green vertical center line (Fig. 3-46) or "L1" ("L3") is equal to "L2" ("L4") (Fig. 3-47).

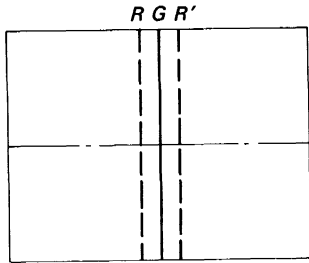


Fig. 3-46

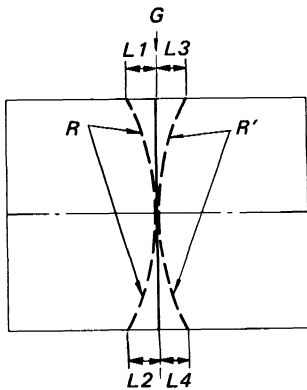


Fig. 3-47

Movement of H SKEW (R)

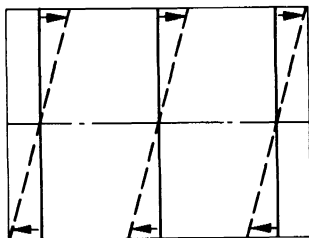
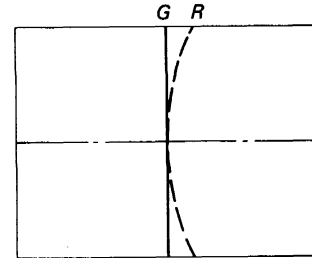
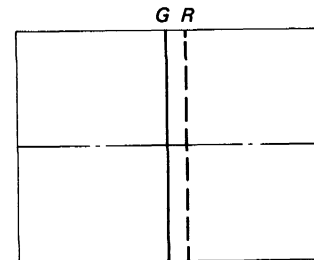


Fig. 3-48

- (3) Adjust RV5514 (H BOW (R)) so that the red vertical center line is parallel with the green vertical center line.
- (4) Adjust RV5502 (H CENT (R)) to converge the red vertical center line and the green vertical center line as shown in Fig. 3-49.



Adjust RV5514  
(H BOW (R))



Adjust RV5502  
(H CENT (R)).

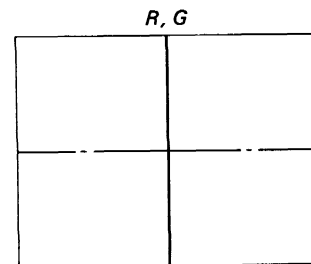


Fig. 3-49

Movement of H BOW (R)

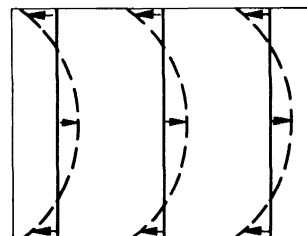


Fig. 3-50

- (5) When the red vertical center line does not coincide with the green vertical center line as shown in Fig. 3-51, repeat above steps (2) through (4).

*Red line coincides  
with green line at points B, E and H.*

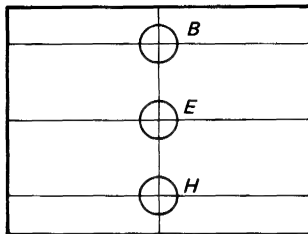
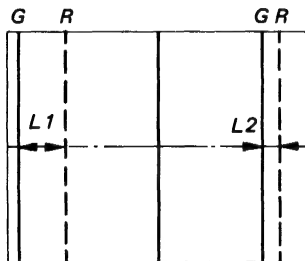
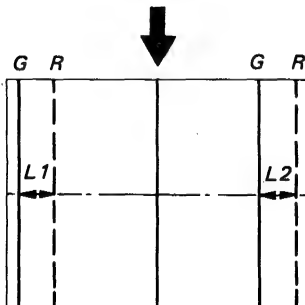


Fig. 3-51

- (6) Adjust RV5504 (H SIZE (R)) so that "L1" is equal to "L2" in the middle of screen as shown in Fig. 3-52.



$L1 \neq L2$



$L1 = L2$

Fig. 3-52

*Movement of H SIZE (R)*

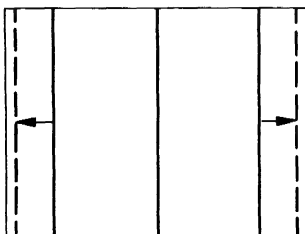


Fig. 3-53

- (7) Adjust RV5506 (H LIN (R)) so that "L1", "L2" and "L3" are equal in the middle of screen as shown in Fig. 3-54.

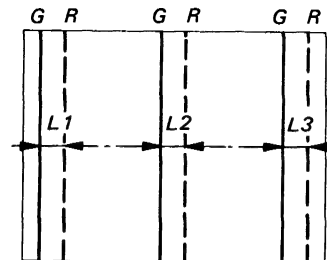


Fig. 3-54

*Movement of H LIN (R)*

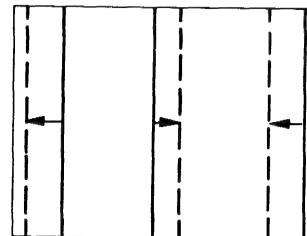


Fig. 3-55

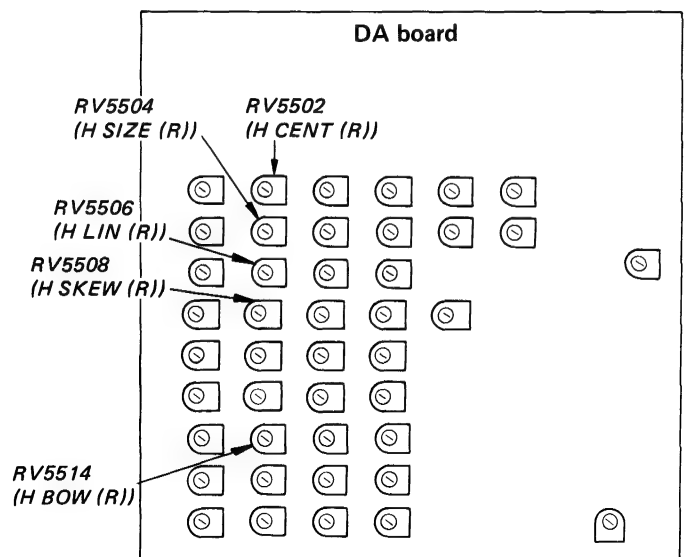


Fig. 3-56

- (8) Adjust RV5502 (H CENT (R)) to converge the red vertical lines and the green vertical lines in the middle of screen as shown in Fig. 3-57.

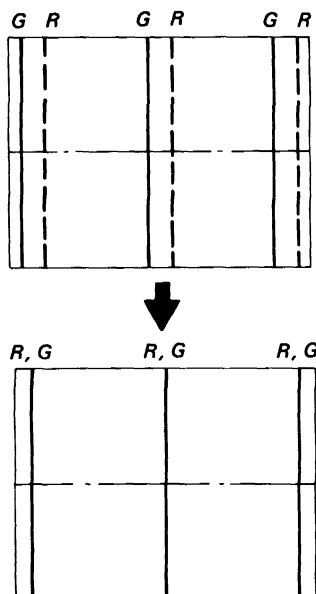


Fig. 3-57

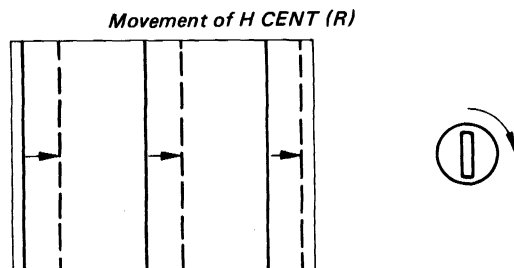


Fig. 3-58

- (9) When the red vertical lines do not coincide with the green vertical lines as shown in Fig. 3-59, repeat above steps (6) through (8).

Red lines coincide with green lines at points D, E and F.

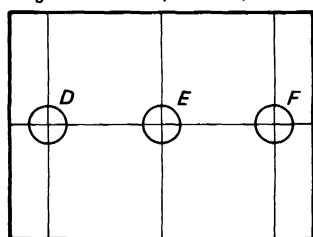


Fig. 3-59

- (10) Adjust RV5510 (H KEYS (R)) so that L1 and L2 are equal as shown in Fig. 3-60.

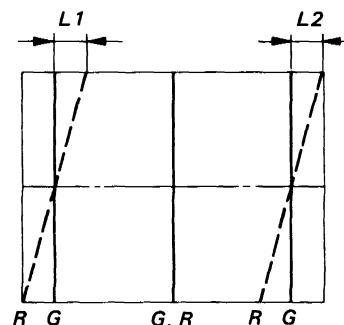


Fig. 3-60

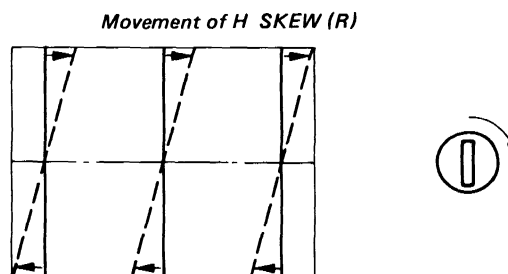


Fig. 3-61

- (11) When the red vertical center line slants, adjust RV5508 (H SKEW (R)).  
 (12) Adjust RV5512 (H SUB SKEW (R)) so that "L1" ("L3") is equal to "L2" ("L4") as shown in Fig. 3-62.

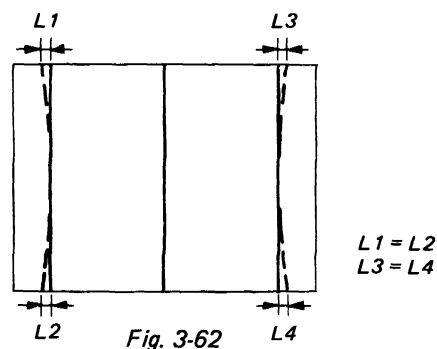


Fig. 3-62

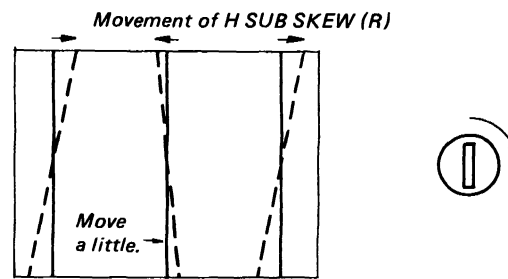


Fig. 3-63

- (13) If necessary, repeat above steps (10) through (12).
- (14) Adjust RV5517 (H PIN (R)) so that "L1", "L2", "L3" and "L4" are equal as shown in Fig. 3-64.

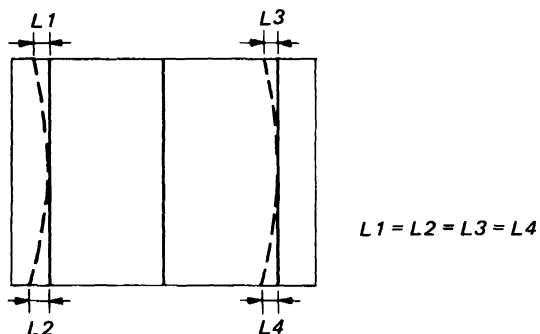


Fig. 3-64

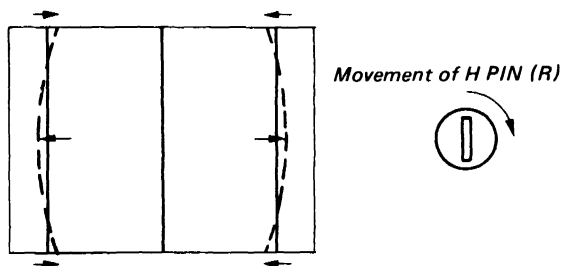


Fig. 3-65

- (15) Adjust RV5519 (H SUB BOW (R)) finely so that the red vertical lines coincide with the green horizontal lines as shown in Fig. 3-66.
- (16) When the mis-registration appears on the screen, perform the necessary adjustment finely.

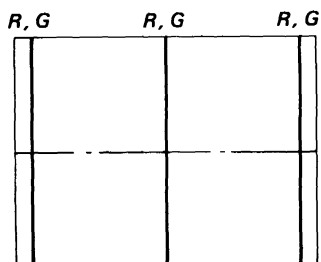


Fig. 3-66

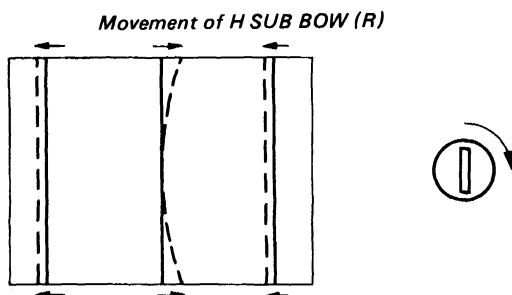


Fig. 3-67

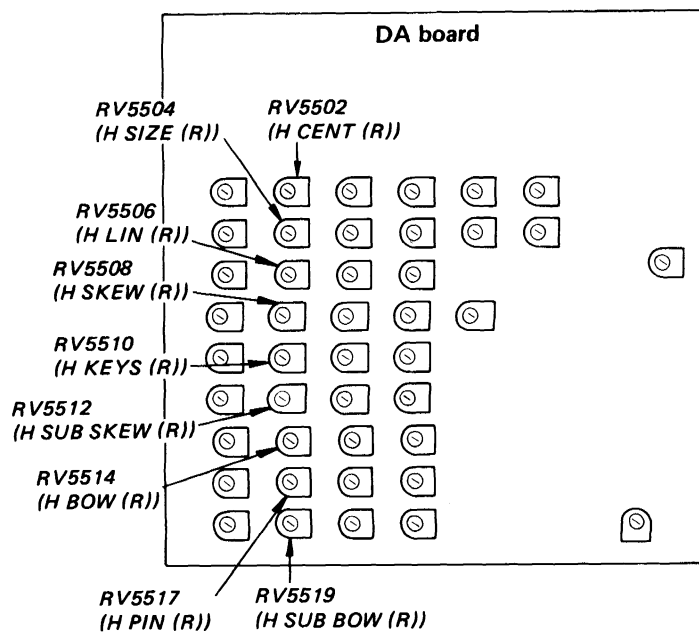


Fig. 3-68

## 7. VERTICAL AND HORIZONTAL ADJUSTMENTS OF RED AND BLUE PICTURES

**Note:** Perform each adjustment for the red and blue registration by the way as same as the green and red registration adjustment (Refer to the procedures 4, 5 and 6).

Do not touch RV5543 (V KEYS ADJ) and RV5544 (SUB KEYS ADJ) at the red and blue registration adjustment.

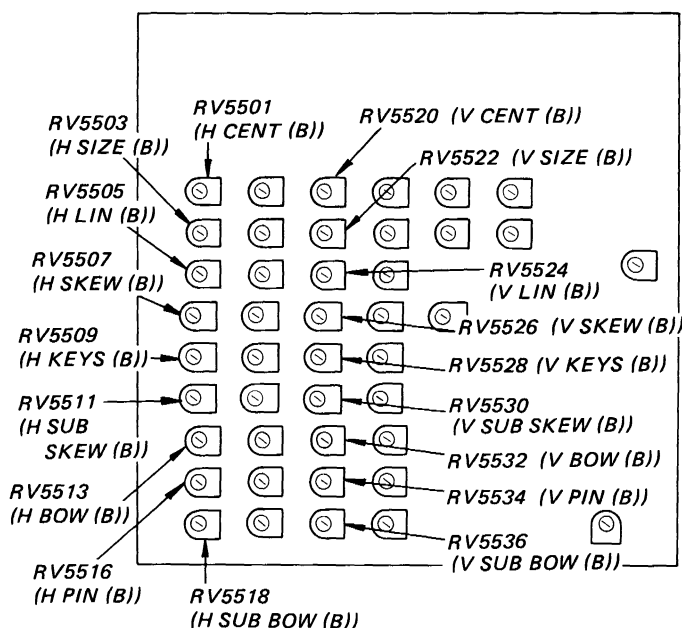


Fig. 3-69

### Preparation of Red and Blue Pictures Adjustment

- (1) Rotation of blue deflection yoke.
- (2) Rotation of blue neck assembly.
- (3) RV5520 (V CENT (B))
- (4) RV5501 (H CENT (B))
- (5) RV5528 (V KEYS (B))
- (6) RV5507 (H SKEW (B))

### Vertical Adjustment of Red and Blue Pictures

- (1) Rotation of blue deflection yoke.
- (2) Rotation of blue neck assembly.
- (3) RV5522 (V SIZE (B))
- (4) RV5524 (V LIN (B))
- (5) RV5520 (V CENT (B))
- (6) If necessary, repeat above steps.
- (7) RV5532 (V BOW (B))
- (8) RV5520 (V CENT (B))
- (9) RV5526 (V SKEW (B))
- (10) If necessary, repeat above steps (7) through (9).
- (11) RV5528 (V KEYS (B))
- (12) RV5526 (V SKEW (B))
- (13) RV5530 (V SUB SKEW (B))

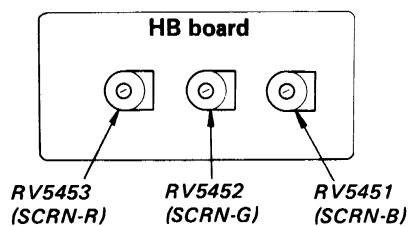
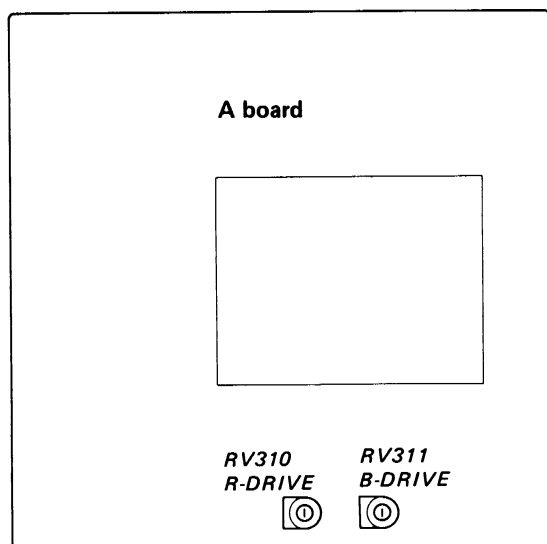
- (14) If necessary, repeat above steps (11) through (13).
- (15) RV5534 (V PIN (B))
- (16) RV5536 (V SUB BOW (B))
- (17) Fine adjustment.

### Horizontal Adjustment of Red and Blue Pictures

- (1) RV5507 (H SKEW (B))
- (2) RV5513 (H BOW (B))
- (3) RV5501 (H CENT (B))
- (4) If necessary, repeat above steps.
- (5) RV5503 (H SIZE (B))
- (6) RV5505 (H LIN (B))
- (7) RV5501 (H CENT (B))
- (8) If necessary, repeat above steps (5) through (7).
- (9) RV5509 (H KEYS (B))
- (10) RV5507 (H SKEW (B))
- (11) RV5511 (H SUB SKEW (B))
- (12) If necessary, repeat above steps (9) through (11).
- (13) RV5516 (H PIN (B))
- (14) RV5518 (H SUB BOW (B))
- (15) Fine adjustment.

**3-2. WHITE BALANCE ADJUSTMENT**

- (1) Control and switch should be set as follows:  
TEST/NORMAL switch . . . .TEST  
COLOR control . . . . .fully counterclockwise
- (2) Tune in an off-air signal.
- (3) Set RV5451 (SCRN-B), RV5452 (SCRN-G)  
and RV5453 (SCRN-R) to mechanical-mid  
position.
- (4) Turn the BRIGHT and the PICTURE controls  
fully counterclockwise.
- (5) Cover the red and blue lenses with caps or  
equivalents.
- (6) Turn RV5452 (SCRN-G) slowly to obtain  
a faintly visible cross-hatch on the screen.
- (7) Remove the caps.
- (8) Adjust RV5451 (SCRN-B) and RV5453 (SCRN  
-R) for best white balance (nautral gray) of  
faint cross-hatch.
- (9) Turn the BRIGHT and the PICTURE controls  
fully clockwise.
- (10) Adjust RV310 (R DRIVE), RV311 (B DRIVE)  
for best white balance.
- (11) Repeat the above steps (8) through (11) two  
or three times.

*Fig. 3-70**Fig. 3-71*



## SECTION 4 CIRCUIT ADJUSTMENTS

**Note:**

**(1) TEST EQUIPMENT REQUIRED**

1. Variable auto-transformer
2. Isolation transformer
3. Electrostatic voltmeter  
or  
Digital multimeter  
(Capable of measuring the voltage is more than 1,100V).
4. Frequency counter
5. Color-bar/pattern generator

**(2) INPUT SIGNAL**

When making these adjustment, supply a white pattern, a color-bar or an off-air signal.

**(3) CONTROLS AND SWITCHES SETTING**

Controls and switches should be set as follows when making checks and adjustments unless otherwise noted.

PICTURE control  
BRIGHT control  
COLOR control  
HUE control  
V HOLD control

Set for a best picture.

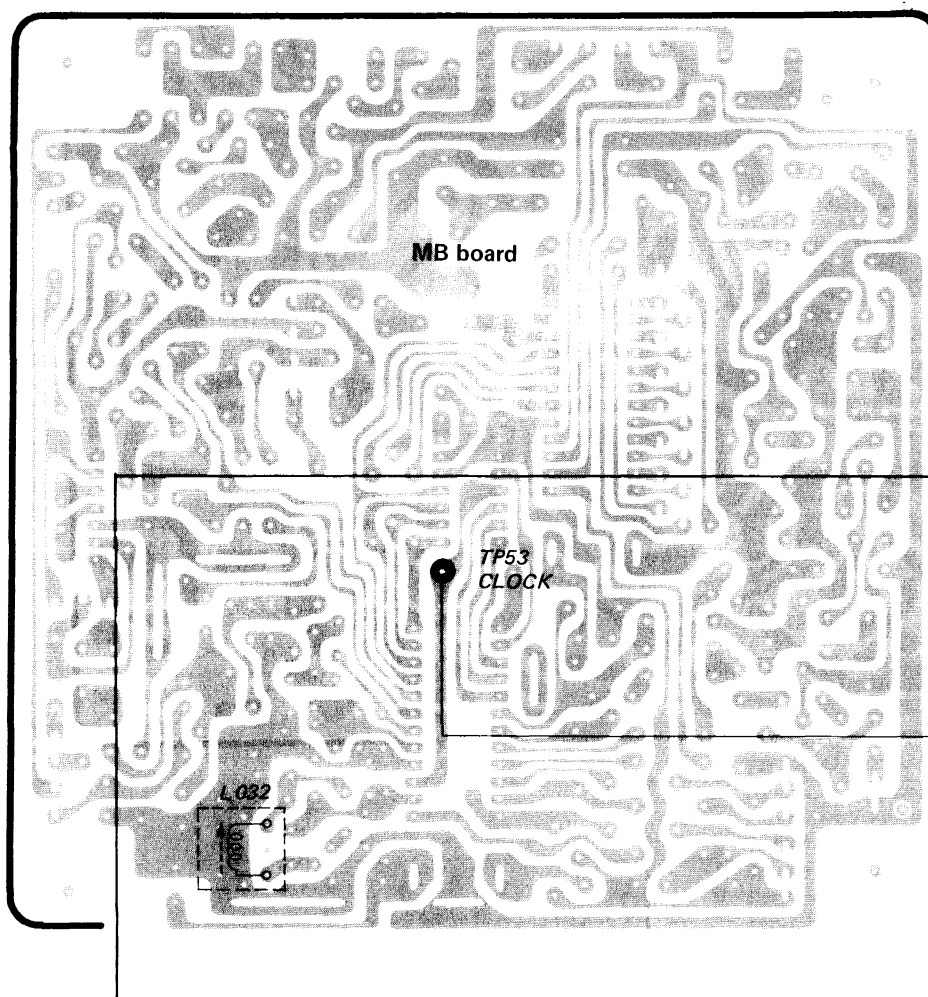
**4-1. MB BOARD ADJUSTMENT**

AFT switch . . . . .ON  
AUTO switch . . . . .ON  
TEST/NORMAL switch . . . .NORMAL  
CHANNEL SET switch. . . . .OFF

- (4)** These adjustments should be performed with the rated power supply voltage unless otherwise noted.

**(5) CIRCUIT ADJUSTMENTS**

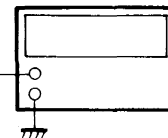
Adjustment	Circuit Board	Page
CLOCK	MB	37
CROSS BAR POSITION ADJUSTMENT	K	38
VHF and UHF TUNER AGG AFT SUB CONTRAST SUB BRIGHT SIF ACC COLOR SYNC	A	39-41
HV HOLD DOWN BIAS ADJUSTMENT HV REG ADJUSTMENT	G	42-44



**CLOCK**

Adjust L032 for  $15.6 \pm 0.1$  kHz on the frequency counter.

frequency counter

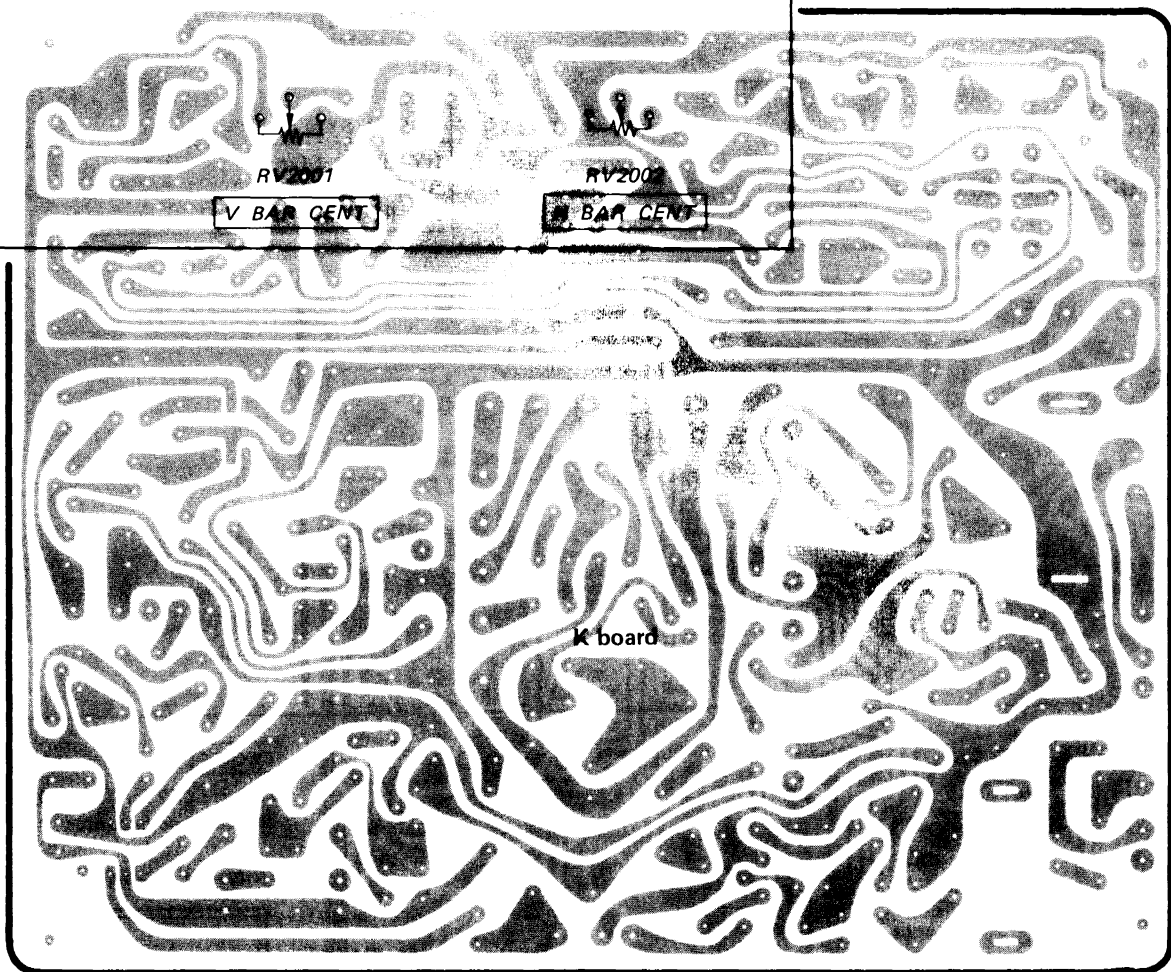




#### 4-2. K BOARD ADJUSTMENT

##### CROSS BAR POSITION ADJUSTMENT

1. Receive an off-air signal.
2. Set the TEST/NORMAL switch to TEST position.
3. Set the HATCH/BAR switch to BAR position.
4. Adjust RV2001 to center the vertical line.
5. Adjust RV2002 to center the horizontal line.



#### 4.3. A BOARD ADJUSTMENTS

##### VHF and UHF TUNER AGC

1. Tune in an off-air signal.
2. Adjust RV201 and RV202 so that snow-noise and cross-modulation disappear from the picture.

##### SIF

1. Tune in an off-air signal.
2. Adjust T206 for maximum clear-sound.

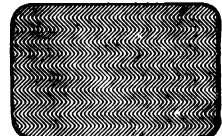
##### ACC

1. Tune
2. Set tl
3. Set tl
4. Adju.
5. Conf
- exces

##### AFT

1. Tune in an off-air signal.
2. Set the AFT switch to OFF.
3. Press the TUNING ► button to obtain the 920kHz beat.
4. Press the TUNING ◀ button to obtain the point where the 920kHz beat just disappears.
5. Set the AFT switch to ON. The 920kHz beat will appear or "no color" will occur, if the adjustment is improper.
6. Set T205 to the point where the 920kHz beat just disappears or normal color is obtainable.

920kHz beat

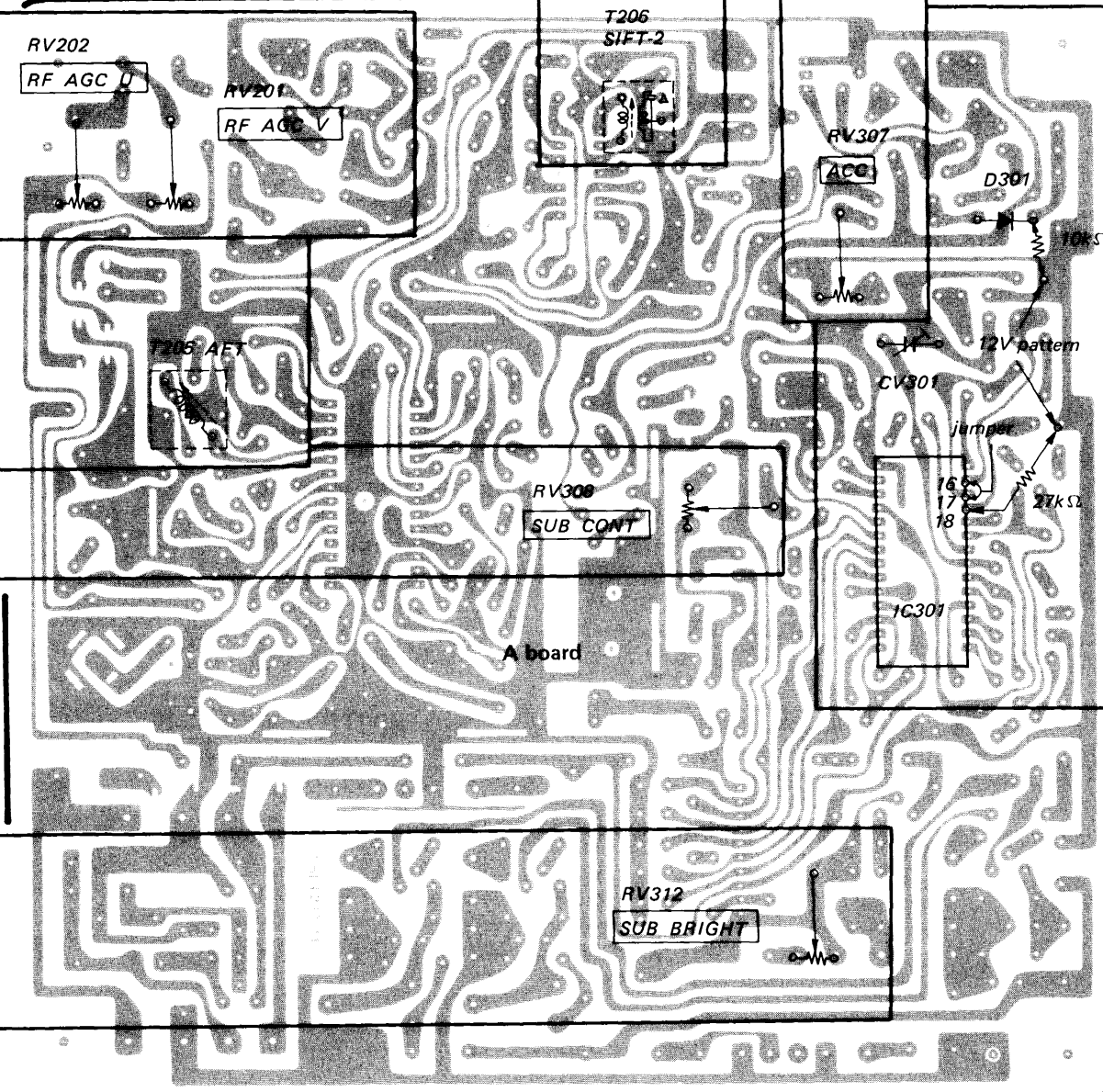


##### SUB CONTRAST

1. Tune in an off-air signal.
2. Set the PICTURE and BRIGHT controls to the suitable picture.
3. Set AUTO switch to OFF and turn the COLOR control to fully counterclockwise to obtain the mono-chrome picture.
4. Adjust RV308 for the suitable contrast picture.
5. Confirm that contrast does no change excessing on other channels.

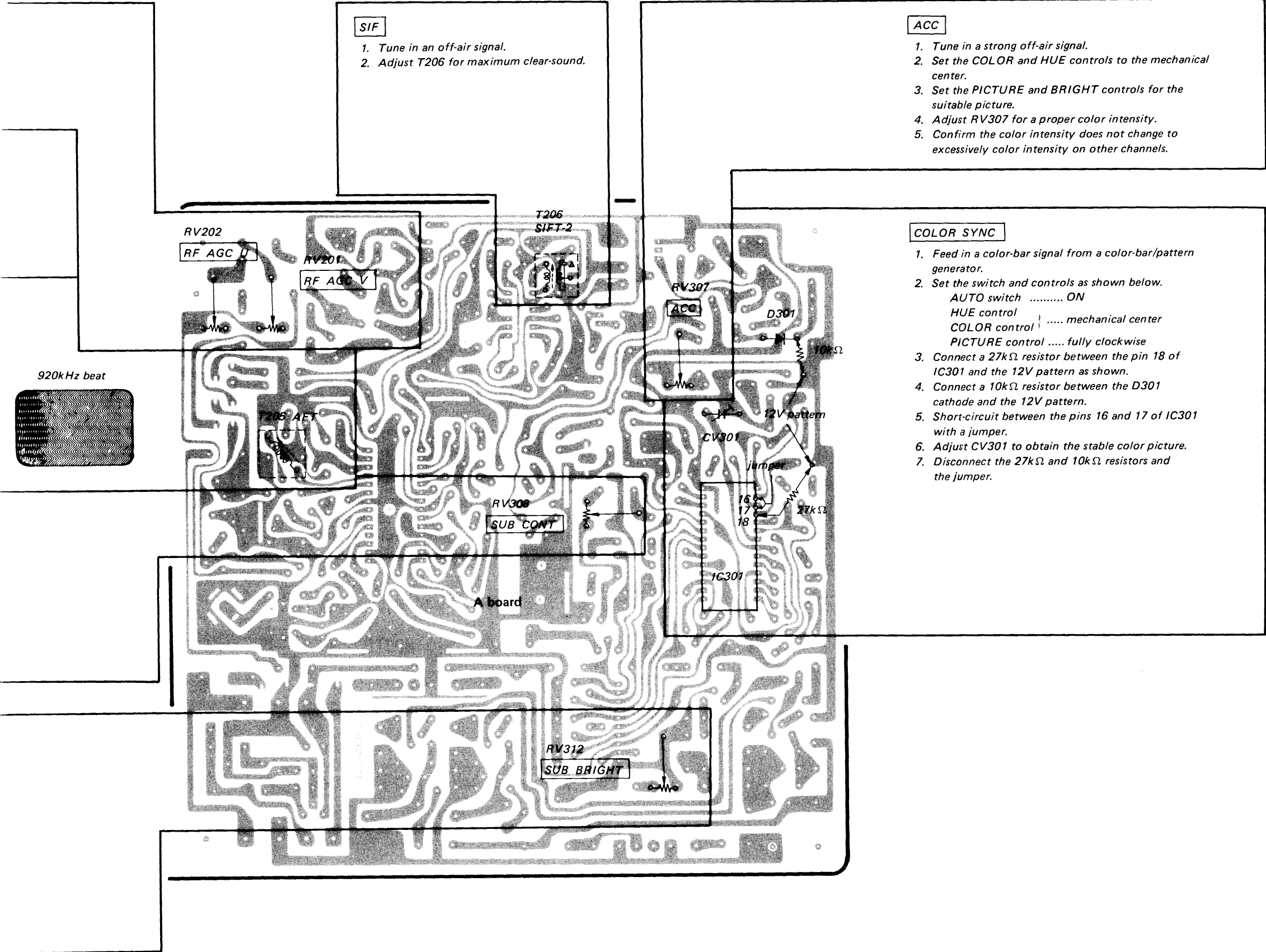
##### SUB BRIGHT

1. Tune in an off-air signal.
2. Turn the PICTURE control to fully counterclockwise, and the BRIGHT control for the suitable picture.
3. Set the AUTO switch to OFF and the COLOR control to fully counterclockwise, so that the mono-chrome picture will appear.
4. Set RV312 for a proper brightness for the picture.
5. Set the PICTURE control for the suitable picture.
6. Confirm that the brightness does not change excessively on other channels.

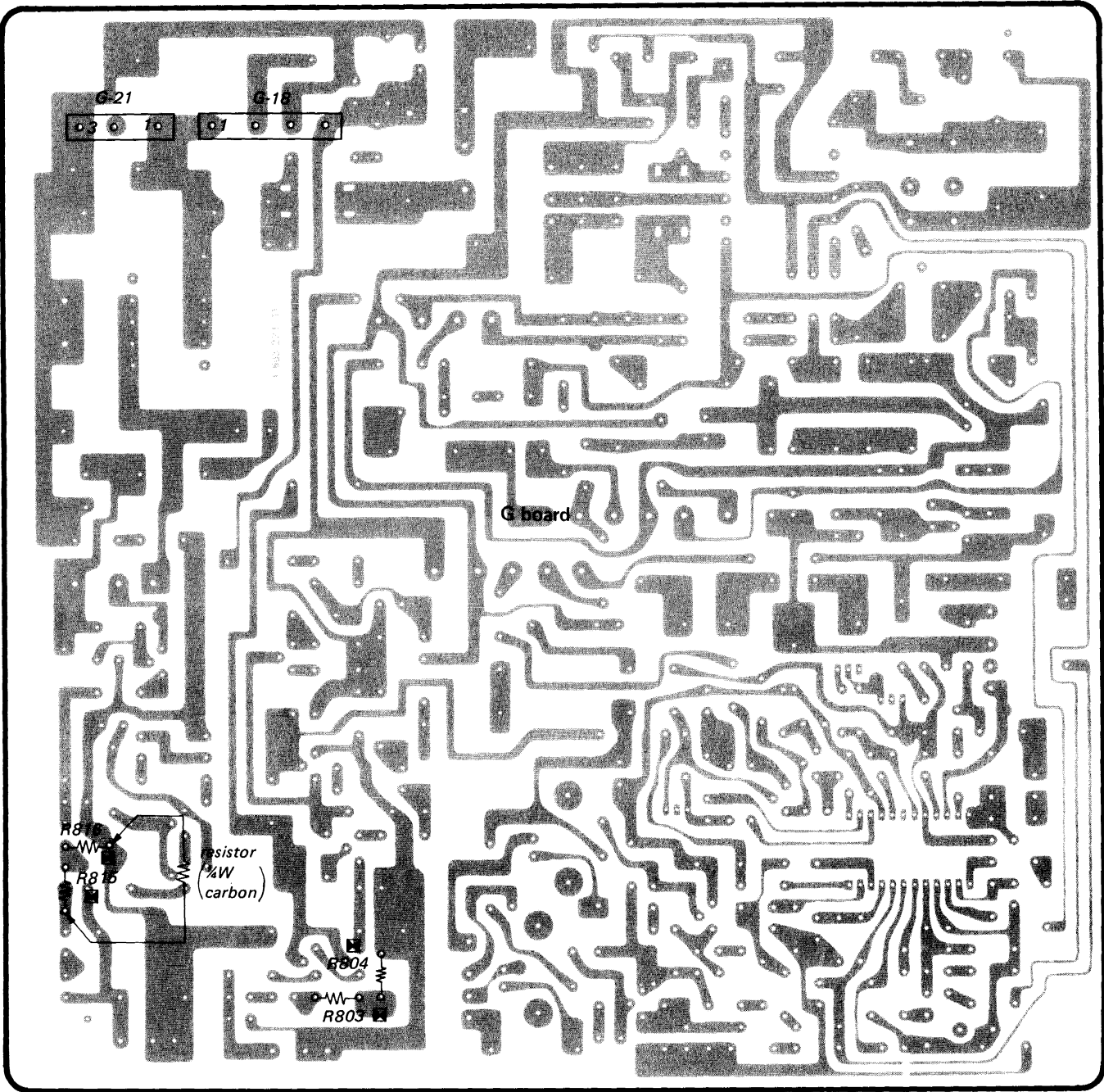


##### COLOR

1. Feed
2. Set tl
- A
- H
- C
- P
3. Conn
- IC30
4. Conn
- cath
5. Short
- with
6. Adju
7. Disc
- the ju



4.4. G BOARD ADJUSTMENTS



When replacing the following components, make the HV HOLD DOWN and HV REG adjustments.  
G board, DC block

- R904 .....in DC block
- IC501, Q801, Q802, Q803, D502, D801, D802, D803, R517, R802, R803, ...in G board
- R804, R809, R825, C806, C807, T801

When replacing the following components, make the HV REG adjustment.

- R905 .....in DC block
- Q806, Q807, D807, D808, D809, D810, R814, R815, R816, R826 ..... in G board

– Electrostatic Voltmeter Method –

HV HOLD DOWN Adjustment  
( R803 and R804)

- (1) Confirm that the POWER switch is OFF position.
- (2) Connect the positive lead of the electrostatic voltmeter to the anode of the picture tube and the negative lead to the ground lug on the chassis as shown in Fig. 4-1.

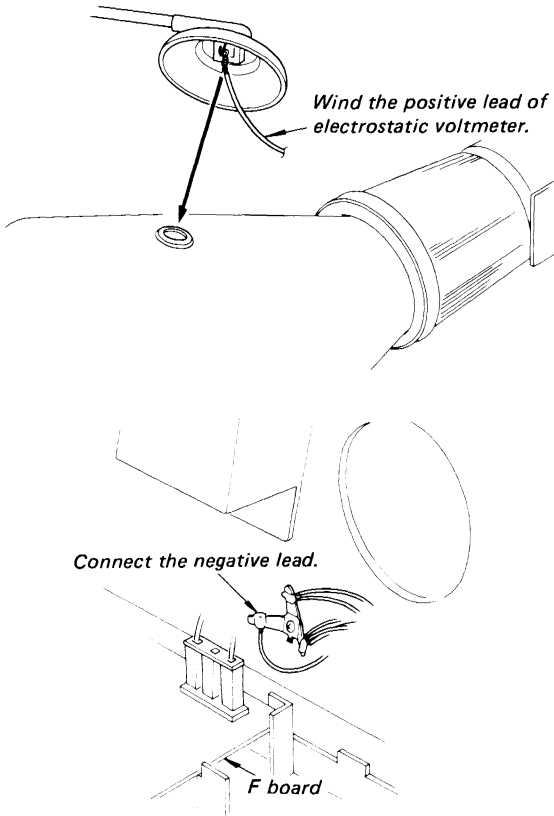


Fig. 4-1

- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the power is automatically turned off just when the voltage on the electrostatic voltmeter is 28.2kV  $\pm$ 300V by connecting a resistor across R815 and R816. (HV HOLD DOWN circuit operates).
- (5) If necessary, select R803 and R804 (1/4W carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF.
- (7) Disconnect the resistor.
- (8) Perform the HV REG adjustment from step 4.

HV REG Adjustment ( R815 and R816)

- (1) Confirm that the POWER switch is OFF position.
- (2) Connect the positive lead of the electrostatic voltmeter to the anode of the picture tube and the negative lead to the ground lug on the chassis as shown in Fig. 4-1.
- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the voltage on the electrostatic voltmeter is 26.0kV  $\pm$ 300V.
- (5) If necessary, select R815 and R816 (1/4W carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF and disconnect the positive and negative leads of the electrostatic voltmeter.

When replacing the following components, make the HV HOLD DOWN and HV REG adjustments.  
G board, DC block  
R904 .....in DC block  
IC501, Q801, Q802, Q803, D502,  
D801, D802, D803, R517, R802, R803, ...in G board  
R804, R809, R825, C806, C807, T801  
When replacing the following components, make the HV REG adjustment.  
R905 .....in DC block  
Q806, Q807, D807, D808, D809,  
D810, R814, R815, R816, R826 ..... in G board

#### — Electrostatic Voltmeter Method —

##### HV HOLD DOWN Adjustment ( R803 and R804)

- (1) Confirm that the POWER switch is OFF position.
- (2) Connect the positive lead of the electrostatic voltmeter to the anode of the picture tube and the negative lead to the ground lug on the chassis as shown in Fig. 4-1.

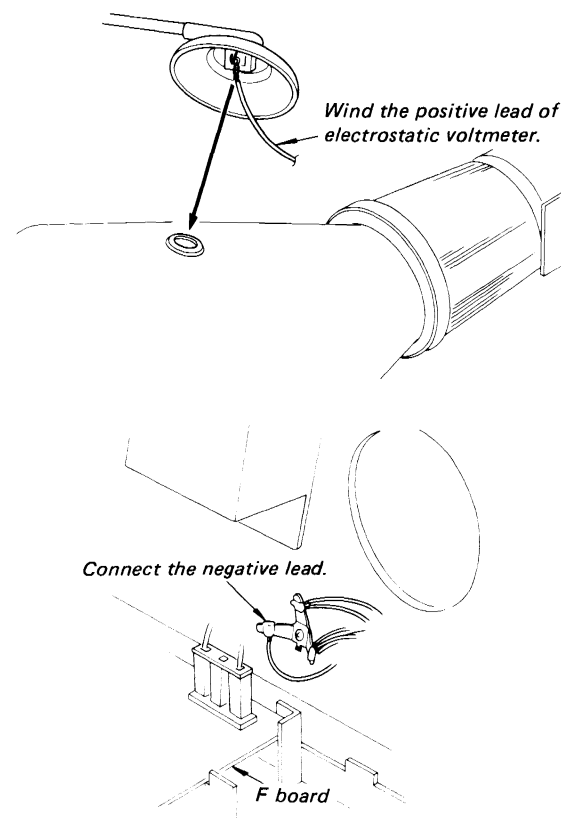


Fig. 4-1

- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the power is automatically turned off just when the voltage on the electrostatic voltmeter is  $28.2\text{kV} \pm 300\text{V}$  by connecting a resistor across R815 and R816. (HV HOLD DOWN circuit operates).
- (5) If necessary, select R803 and R804 ( $\frac{1}{4}\text{W}$  carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF.
- (7) Disconnect the resistor.
- (8) Perform the HV REG adjustment from step 4.

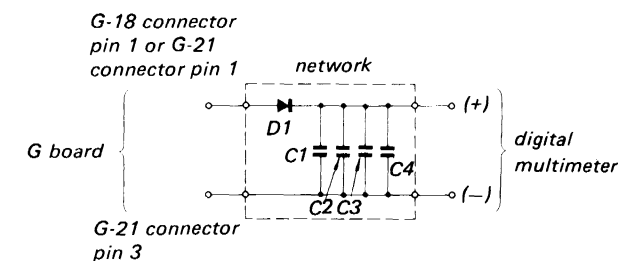
##### HV REG Adjustment ( R815 and R816)

- (1) Confirm that the POWER switch is OFF position.
- (2) Connect the positive lead of the electrostatic voltmeter to the anode of the picture tube and the negative lead to the ground lug on the chassis as shown in Fig. 4-1.
- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the voltage on the electrostatic voltmeter is  $26.0\text{kV} \pm 300\text{V}$ .
- (5) If necessary, select R815 and R816 ( $\frac{1}{4}\text{W}$  carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF and disconnect the positive and negative leads of the electrostatic voltmeter.

#### — Digital Multimeter Method —

##### HV HOLD DOWN Adjustment ( R803 and R804)

- (1) Confirm that the POWER switch is OFF position.
- (2) Make the following network and connect a digital multimeter as shown in Fig. 4-2.



Diode (D1): V-11N (8-719-901-19)

Capacitors (C1–C4): 16,000pF/1.5kV polyethylene  
(1-129-924-00)

Digital multimeter: Capable of measuring the voltages  
is more than 1,100V.

Fig. 4-2

- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the power is automatically turned off just when the voltage on the digital multimeter is  $995\text{V} \pm 6\text{V}$  dc by connecting a resistor across R815 and R816. (HV HOLD DOWN circuit operates).
- (5) If necessary, select R803 and R804 ( $\frac{1}{4}\text{W}$  carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF.
- (7) Disconnect the resistor.
- (8) Perform the HV REG adjustment from step 4.

##### HV REG Adjustment ( R815 and R816)

- (1) Confirm that the POWER switch is OFF position.
- (2) Make the following network and connect a digital multimeter as shown in Fig. 4-2.
- (3) Feed in a white pattern from a color-bar/pattern generator and turn the BRIGHT and PICTURE controls fully counterclockwise. (Be sure to synchronize the picture).
- (4) Turn the POWER switch to ON and confirm that the voltage on the digital multimeter is  $930\text{V} \pm 6\text{V}$  dc.
- (5) If necessary, select R815 and R816 ( $\frac{1}{4}\text{W}$  carbon resistor) and repeat above steps.
- (6) Turn the POWER switch to OFF and disconnect the network and the digital multimeter.



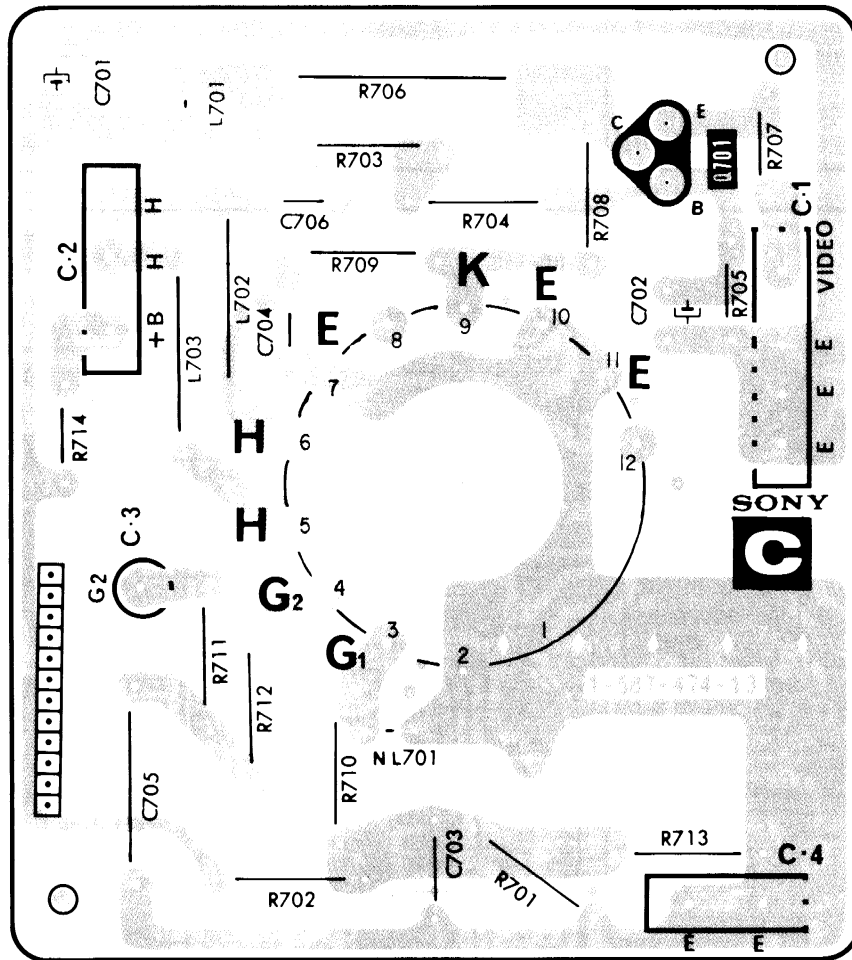
# SECTION 5 DIAGRAMS

[R. G. B. OUT]

C

## 5.1. MOUNTING DIAGRAM Conductor Side —

— C Board —



MB

AUTO TUNING, BAND SW  
NEON DRIVE, AFT

**A**

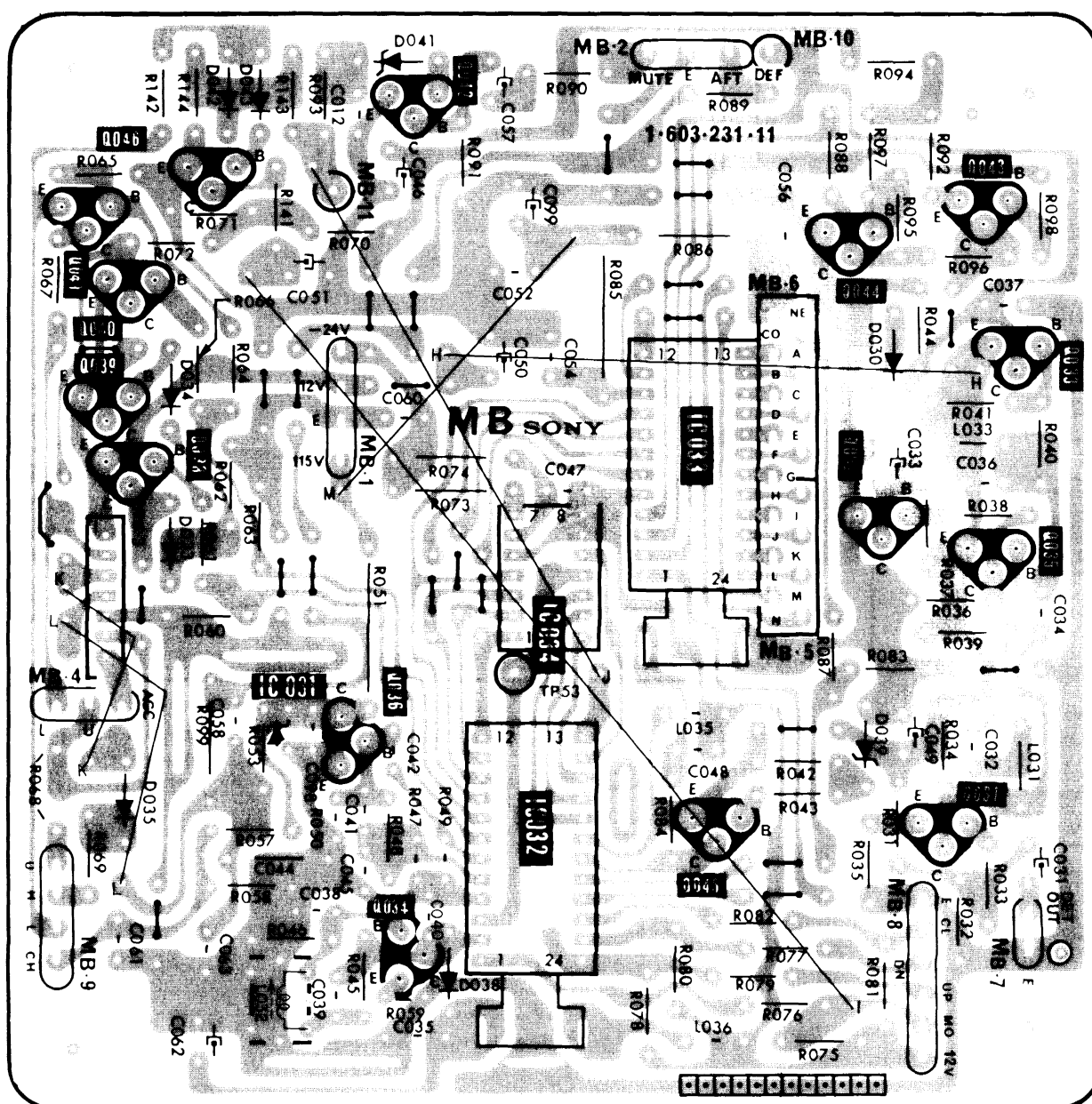
# B

**C**

D

— MB Board —

Q · IC	041 039	040 038	046	IC031	036	042 034	IC034 IC032	IC033 045	044 032	031	043 035	033	Q · IC
D	035	034 033	042,043			041			030 039				D
ADJ						038							ADJ
							L032						

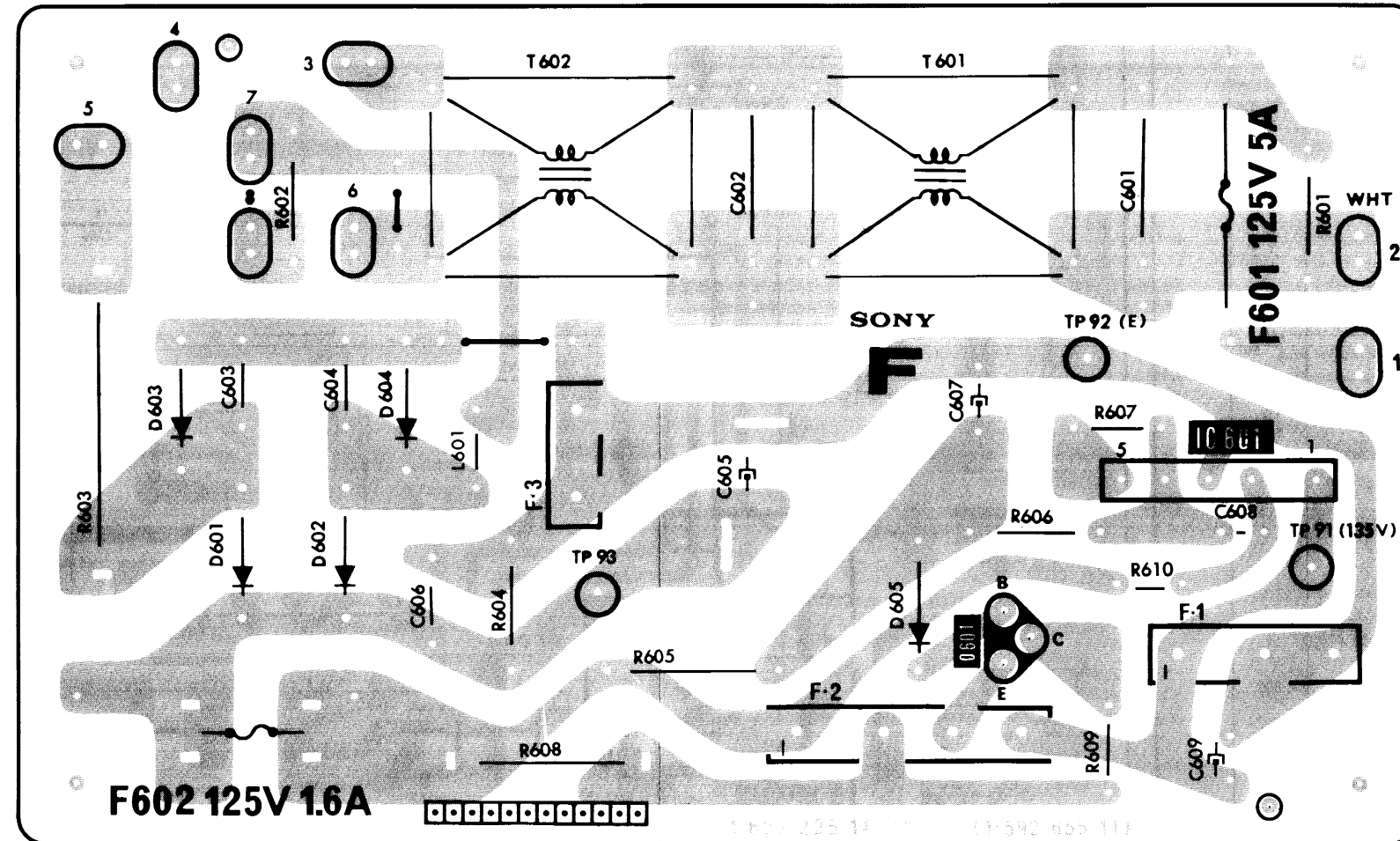


POWER RECT  
135V REG

F

F

— F Board —





G

G

H/V OSC, DRIVE OUT  
HV PROTECT, HV REG  
1K PROTECT, 12V REG

A

B

C

D

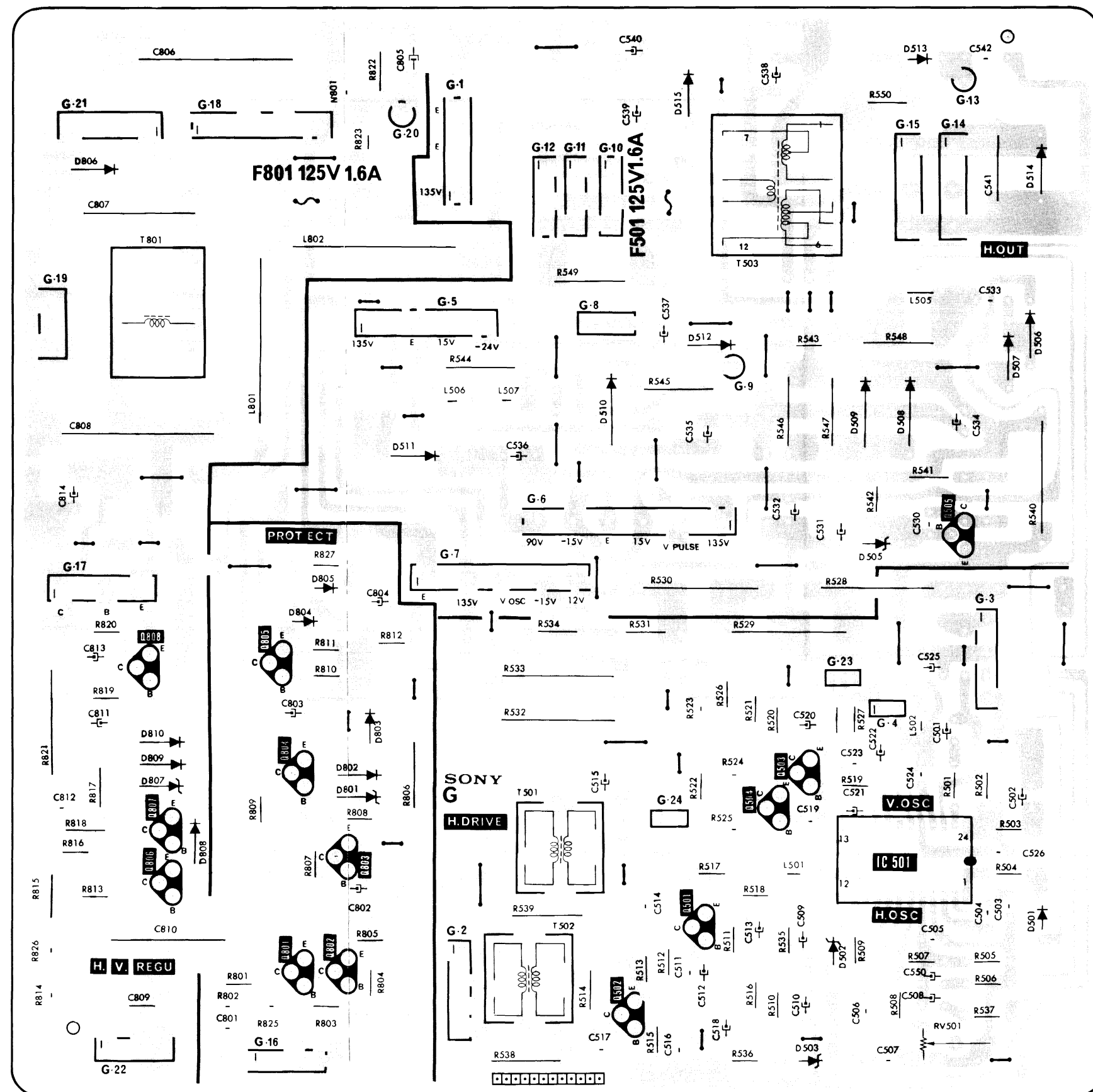
E

F

G

— G Board —

Q, IC	D	ADJ
513		
515		
806	514	
506		
512		
507		
510		
509,508		
511		
505	505	
805		
808	805	
803		
810		
809		
802		
807	801	
504		
807	808	
803		
IC501		
806		
501	501	
	502	
801,802		
502		
503		
		RV501
Q, IC	D	ADJ



MJ

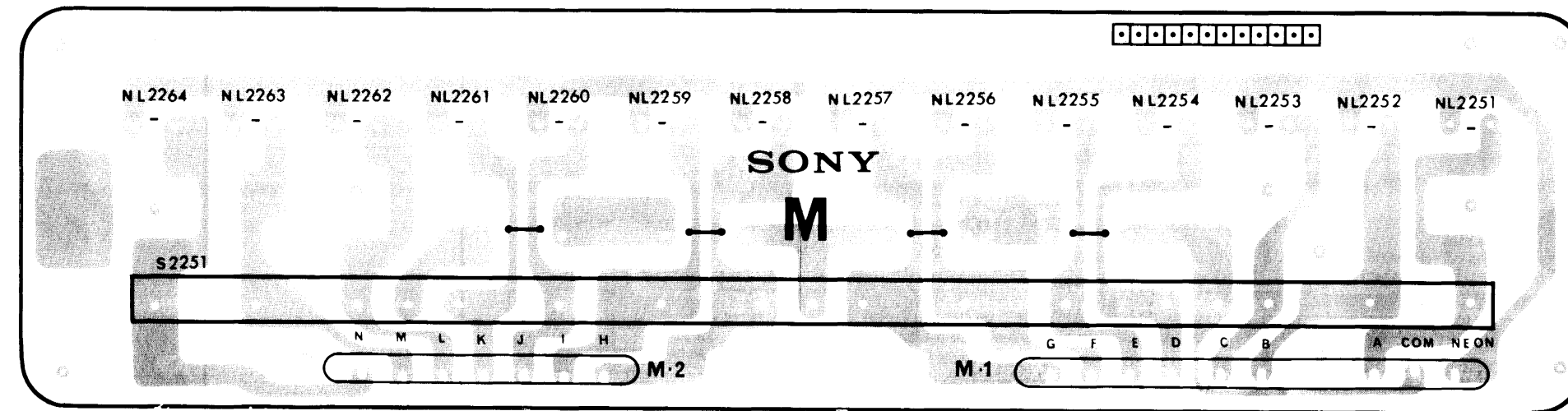
CHANNEL SELECT  
CHANNEL INDICATE

M

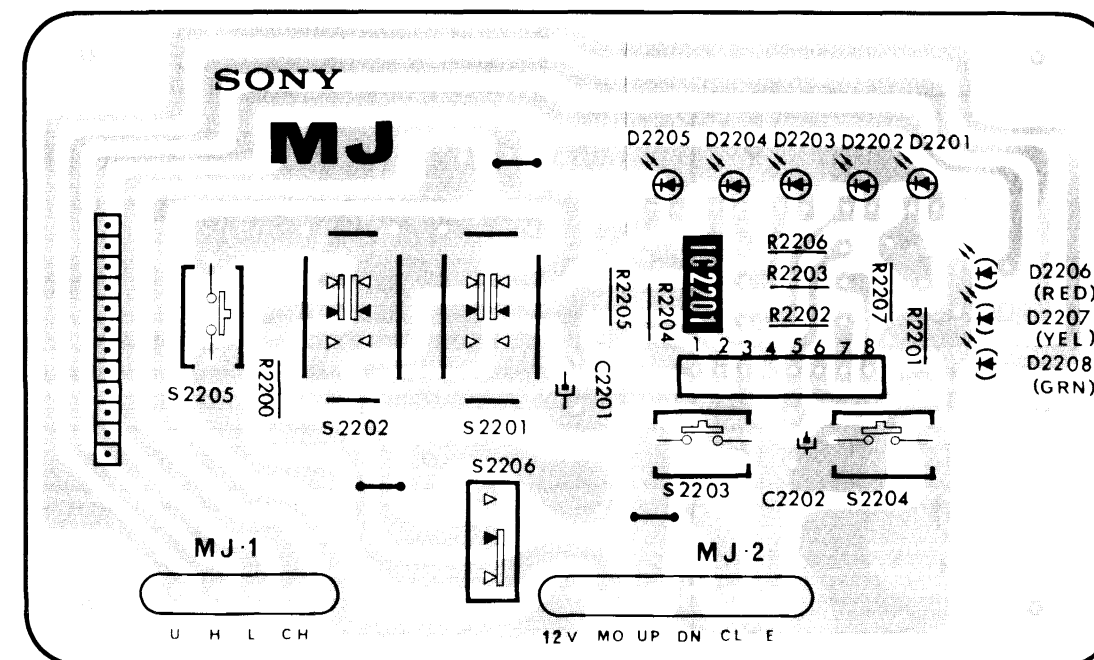
M

MJ

— M Board —



— MJ Board —



[SCRN] **HB** [CUSTOMER CONTROL] **HA** **HA** **S** [TUNER, ACTIVE FILTER]

A

B

C

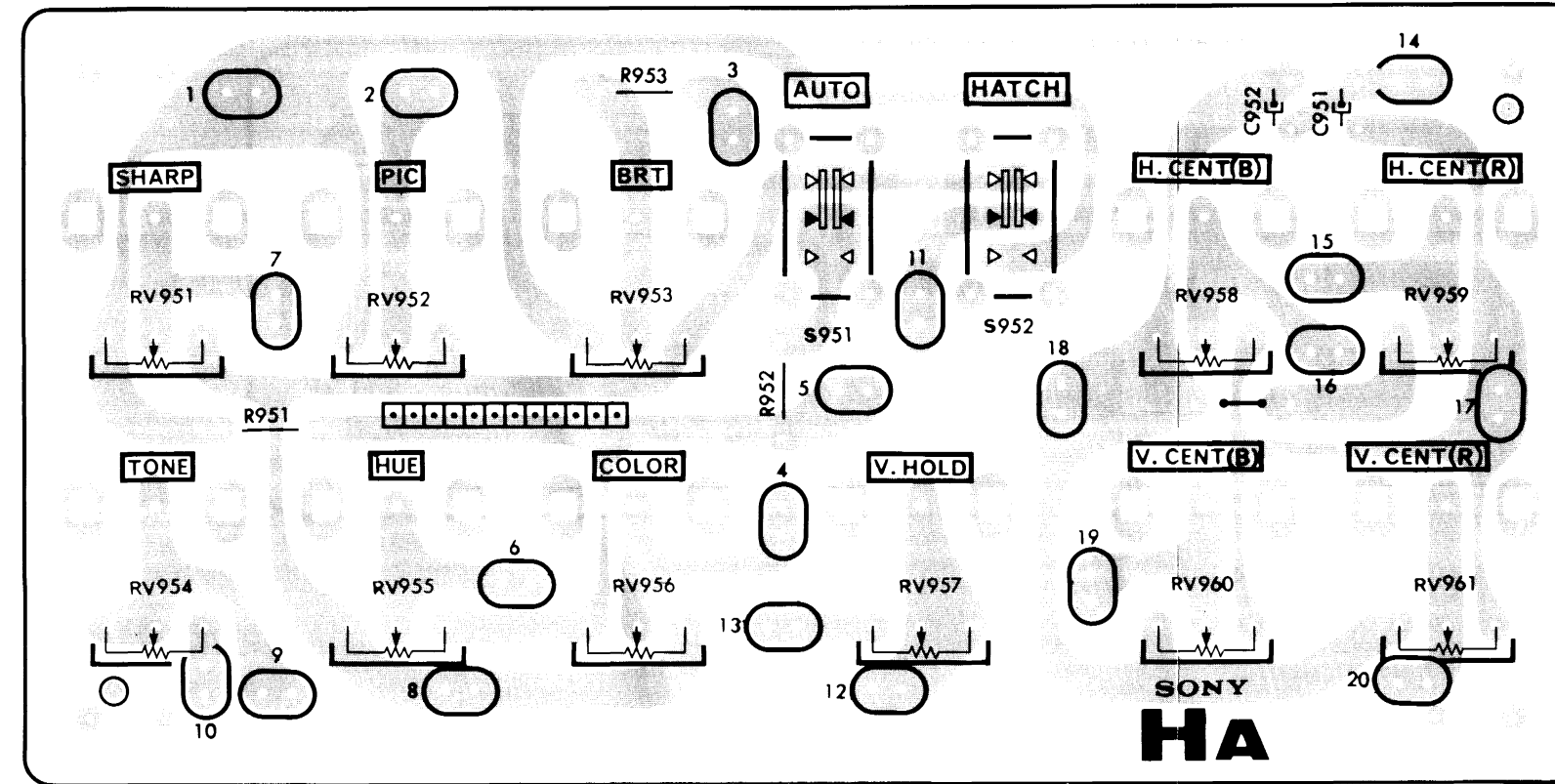
D

E

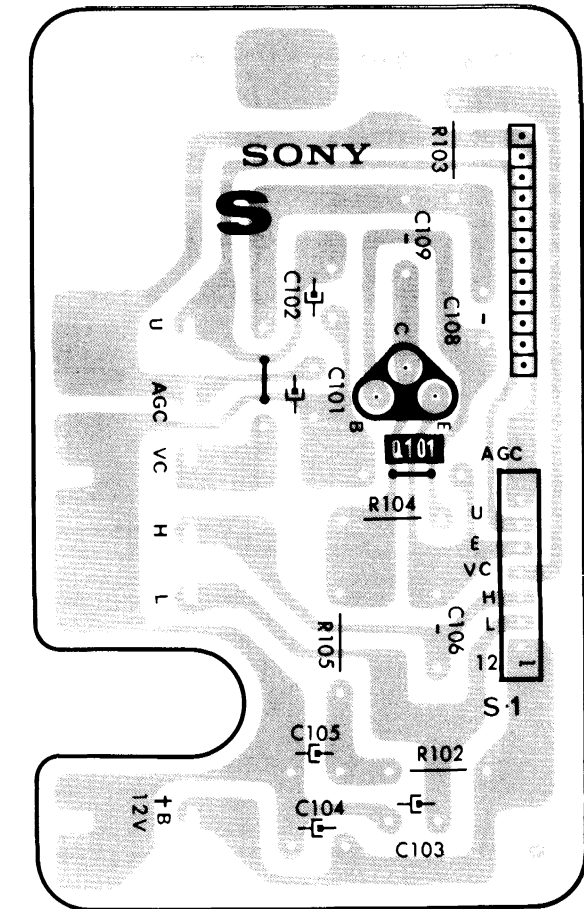
F

G

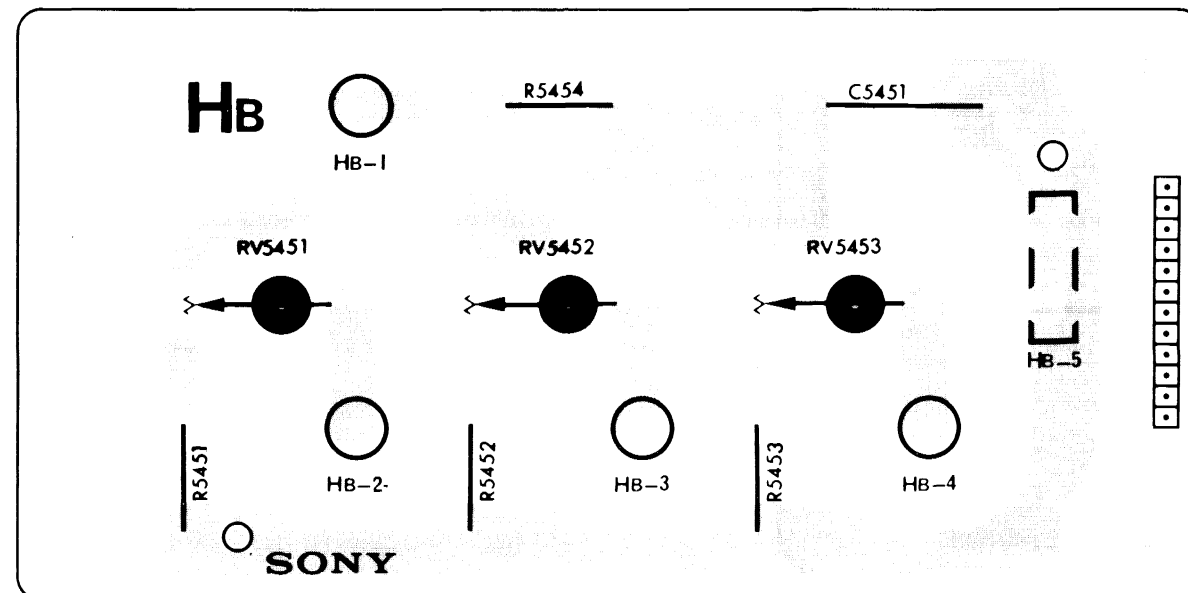
— HA Board —



— S Board —



— HB Board —



1-587-481-11

[ V HATCH, V BAR,  
H HATCH, H BAR, LINE OUT,  
AUDIO OUT, SUB REG OUT ]

K

K

A

**B**

**C**

D

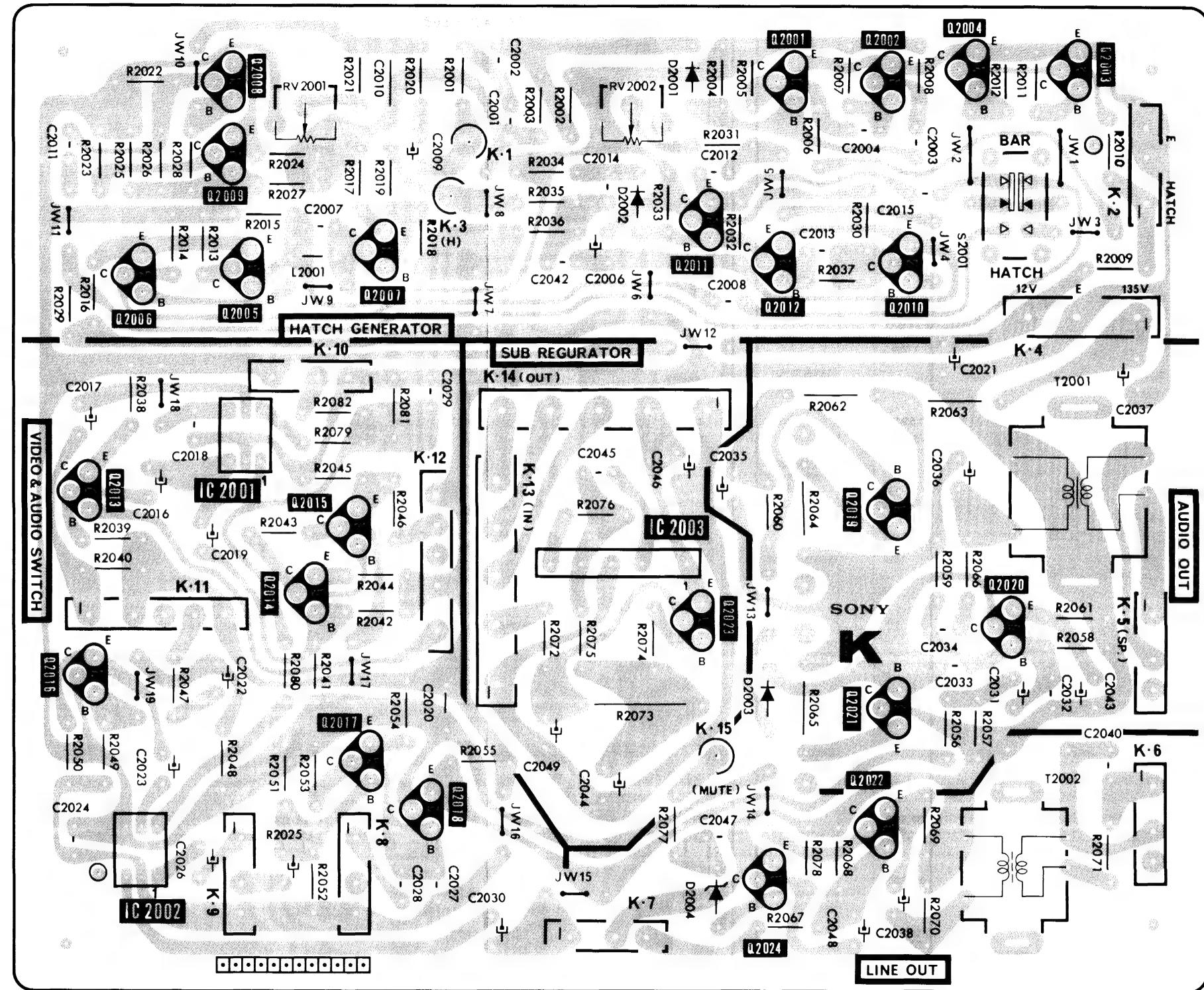
**E**

**F**

## G

– K Board –

IC , Q	D	ADJ
2001,2002 2008 2004,2003	2001	RV2001 RV2002
2009		
2011	2002	
2007 2012,2010 2006,2005		
2019		
IC2003		
2023,2020		
2021	2003	
2022		
2024	2004	
IC , Q	D	ADJ





DA

DA

(H, V REGISTRATION)

A

B

C

D

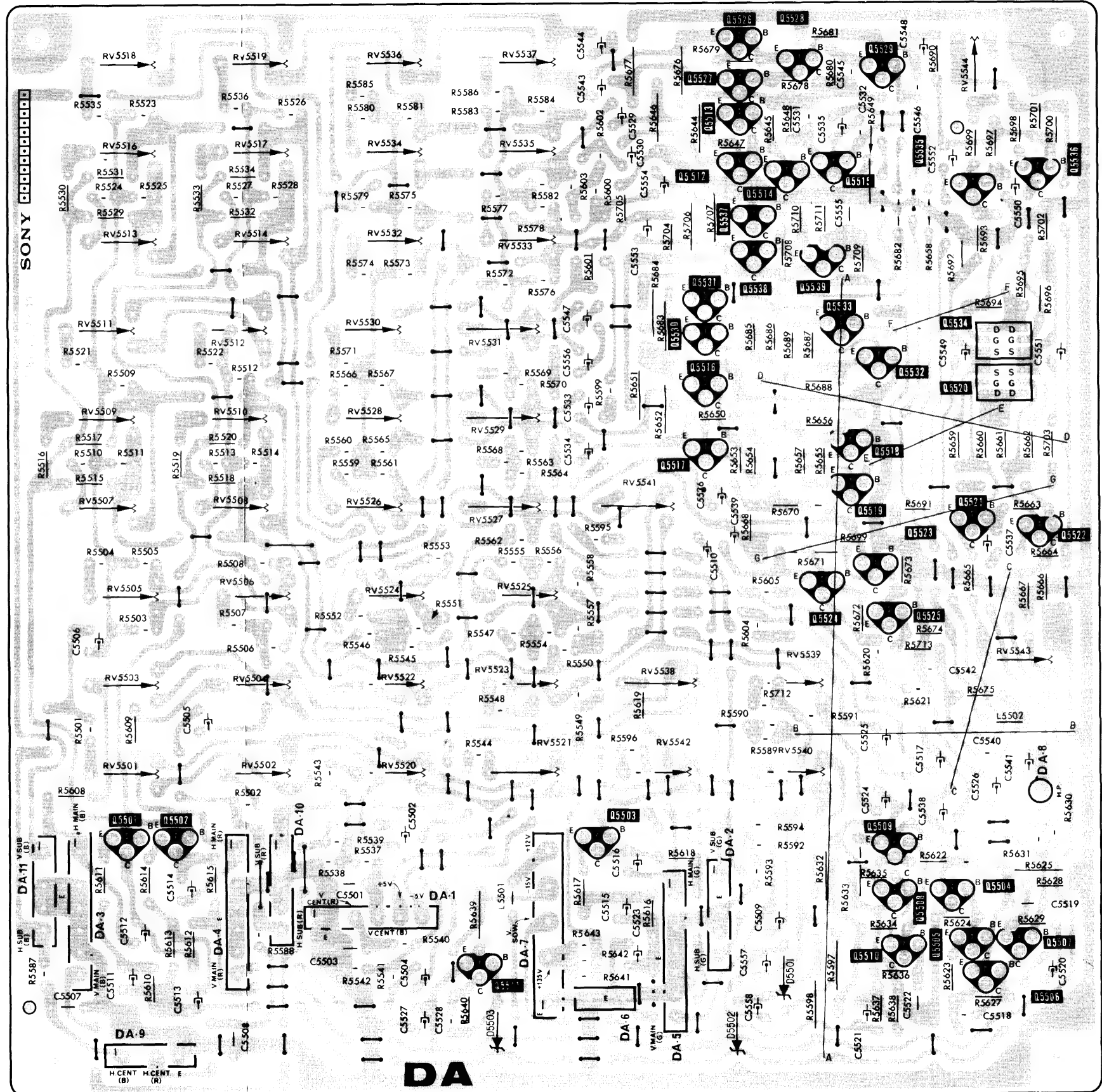
E

F

G

— DA Board —

Q	D	ADJ
5526		RV5544
5528		RV5518, RV5519
5529		RV5536, RV5537
5527		
5513		
5512, 5515		RV5516, RV5517
5514, 5536		RV5534, RV5535
5535		
5537		RV5513, RV5514
5538, 5539		RV5532, RV5533
5531		
5533		RV5511, RV5512
5530		RV5530, RV5531
5534		
5532		
5516		
5520		RV5509, RV5510
5517, 5518		RV5528, RV5529
5519		
5521		RV5507, RV5508
5522		RV5527, RV5527
5523		RV5505, RV5506
5524		RV5524, RV5525
5525		
5501, 5502		RV5543
5503		RV5503, RV5504
5509		RV5522, RV5523
5508, 5504		RV5538, RV5539
5505, 5507		
5506		RV5501, RV5502
5501		RV5520, RV5521
5503		RV5542, RV5540
5502		
Q	D	ADJ



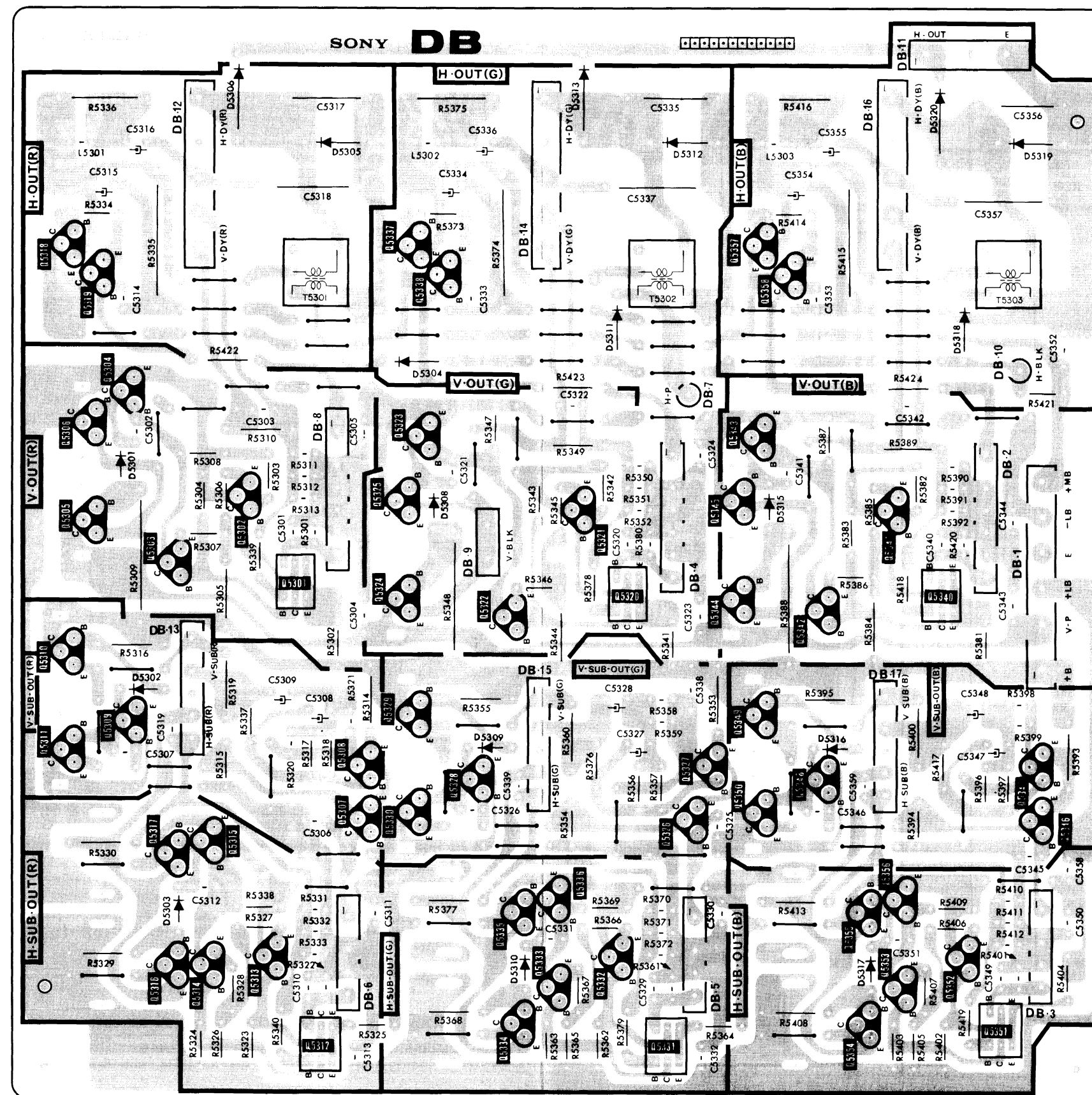
[V DEF, V SUB DEF]  
[H SUB DEF, H PIN]

DB

DB

— DB Board —

Q	D
5306,5313	5320
5305,5319	5312
5318,5337,5357	
5319,5338,5358	
5311,5318	
5304	
5304	
5306	
5323,5343	
5301	
5302	
5325,5345	5308,5315
5321,5341	
5305	
5303	
5301	
5324,5320,5340	
5344	
5322,5342	
5310	
5302	
5329,5349	
5309	
5311	5309,5316
5308,5327,5347	
5328,5348	
5330,5350	
5307,5326	
5315	5346
5317	
5336,5356	
5335,5355	5303
5313,5332,5352	
5316,5314	5310,5317
5333,5353	
5334,5354	
5351	
5312,5331	
Q	D





A

A

VIF, SIF, Y, CHROMA;  
R-G-B DRIVE  
VIDEO SW, BUK

A

B

C

D

E

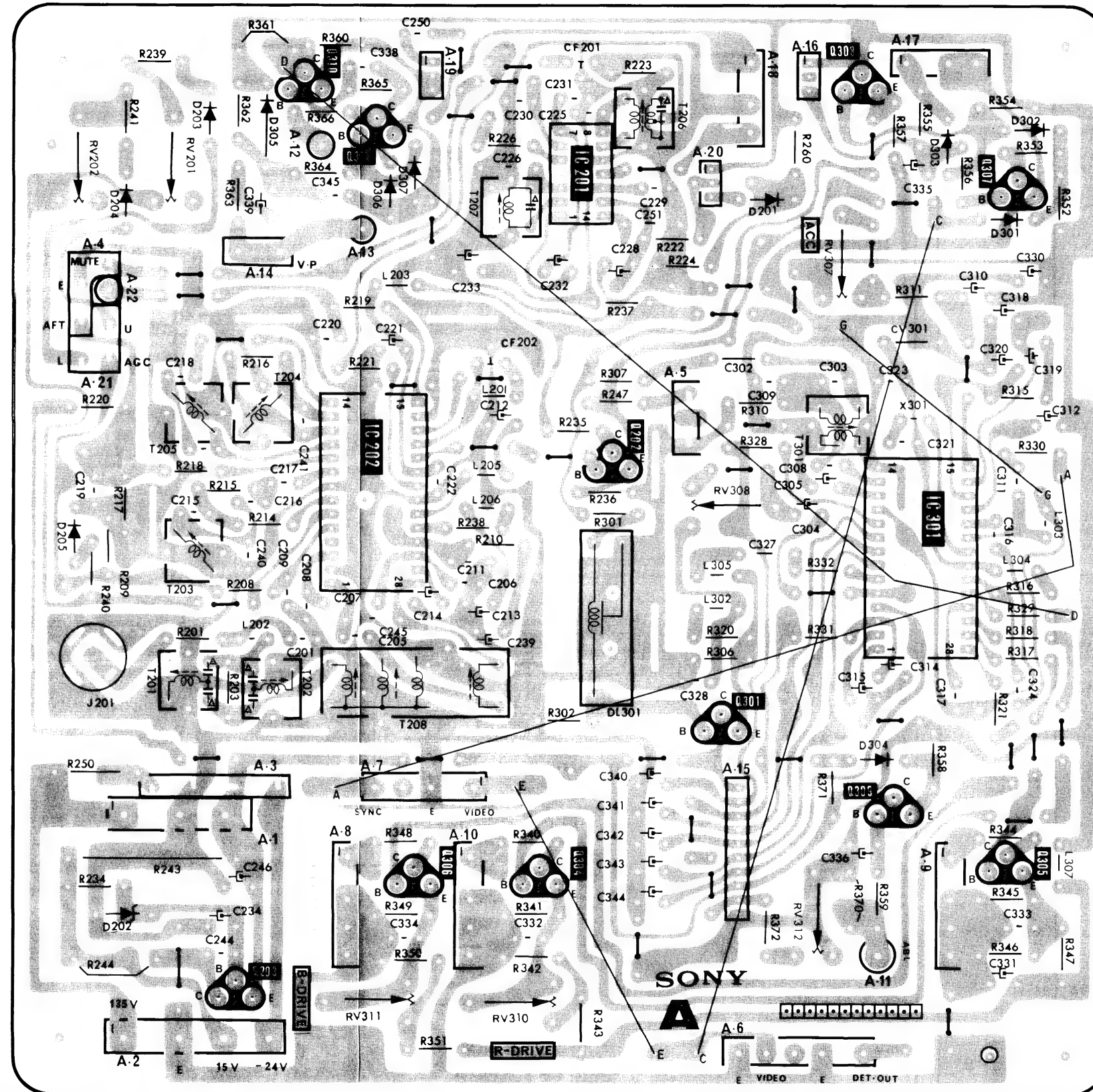
F

G


H

— A Board —







Q, IC	D	ADJ
310 308		
311	203 303 305,302	
IC201 307	307 306 204,201 301	RV202 RV201
		RV307
202		
IC202		RV308
IC301	205	
301		
	304	
309		
305 306,304		
	202	RV312
203		RV311, RV310
Q, IC	D	ADJ








## 5-2. SCHEMATIC DIAGRAM (1/2)

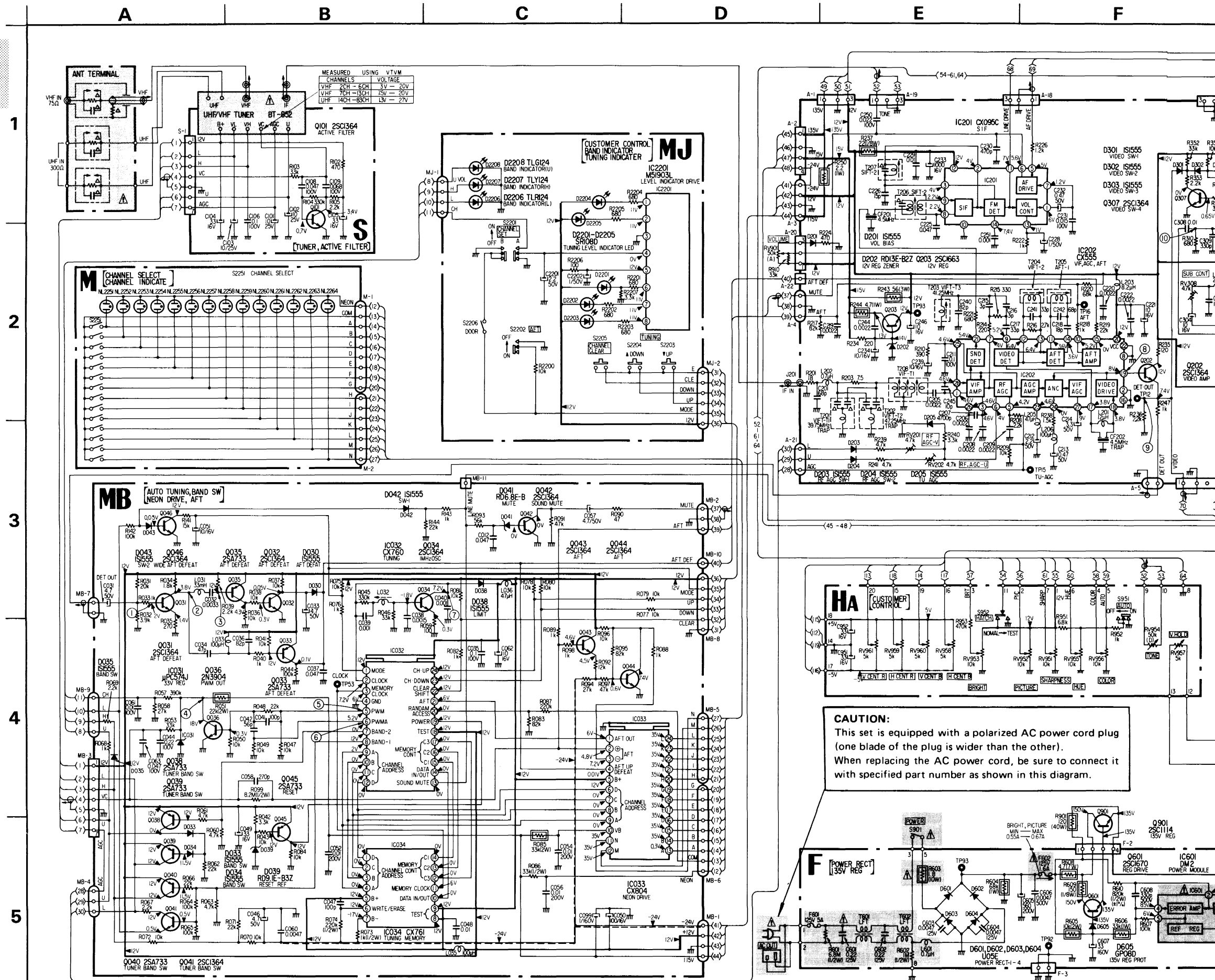
**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.

**Note:**

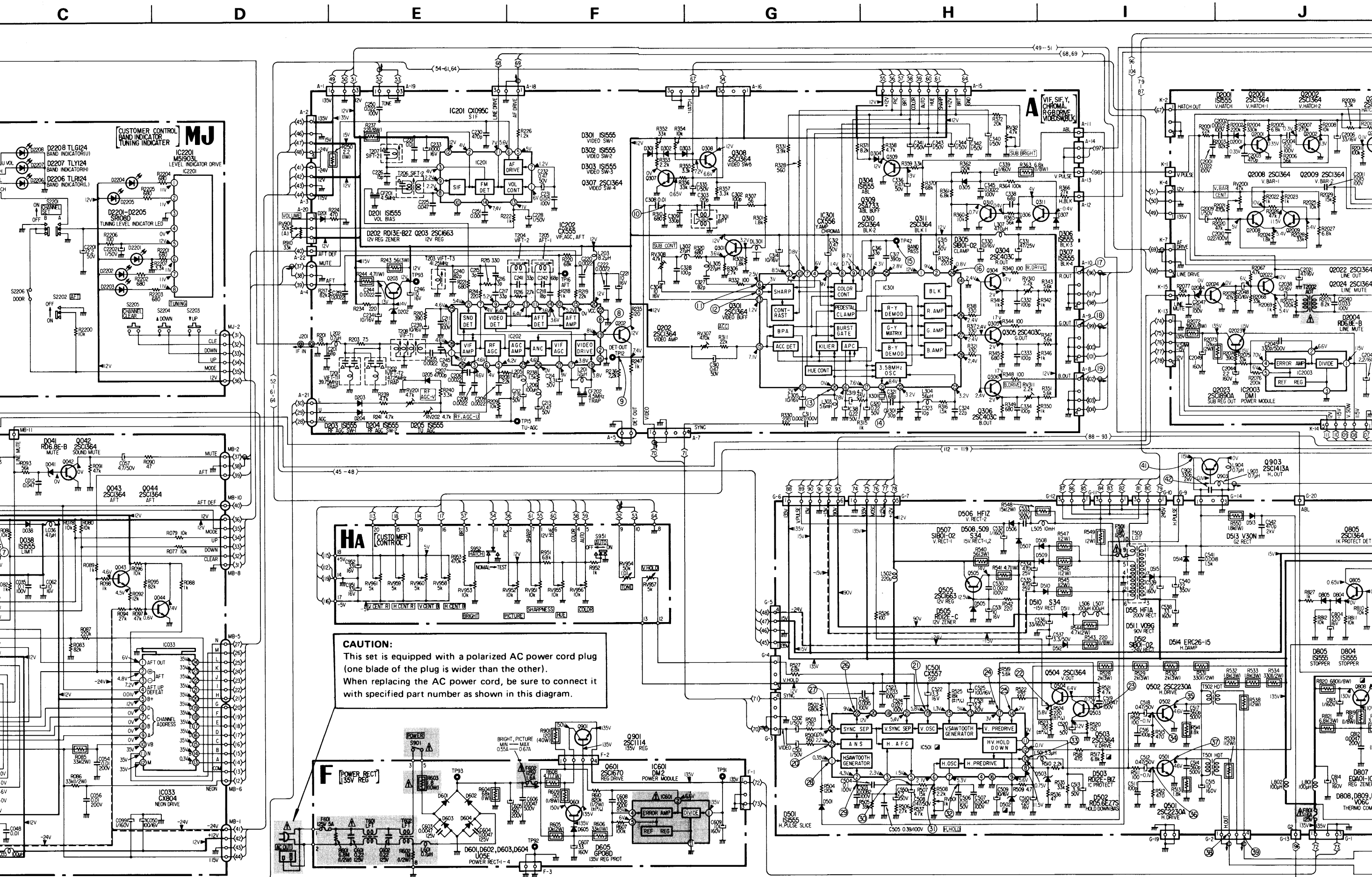
- All capacitors are in  $\mu\text{F}$  unless otherwise noted. p :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{4}\text{W}$  unless otherwise noted.  
k : 1000 $\Omega$ , M : 1000k $\Omega$
-  : nonflammable resistor.
-  : internal component.
-  : panel designation.
- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by  make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by  and repeat the adjustment until the specified value is achieved.  
(Refer to HV HOLD DOWN and HV REG Adjustments on page 42 — 44).
- When replacing the part in below table, be sure to perform the related adjustment.

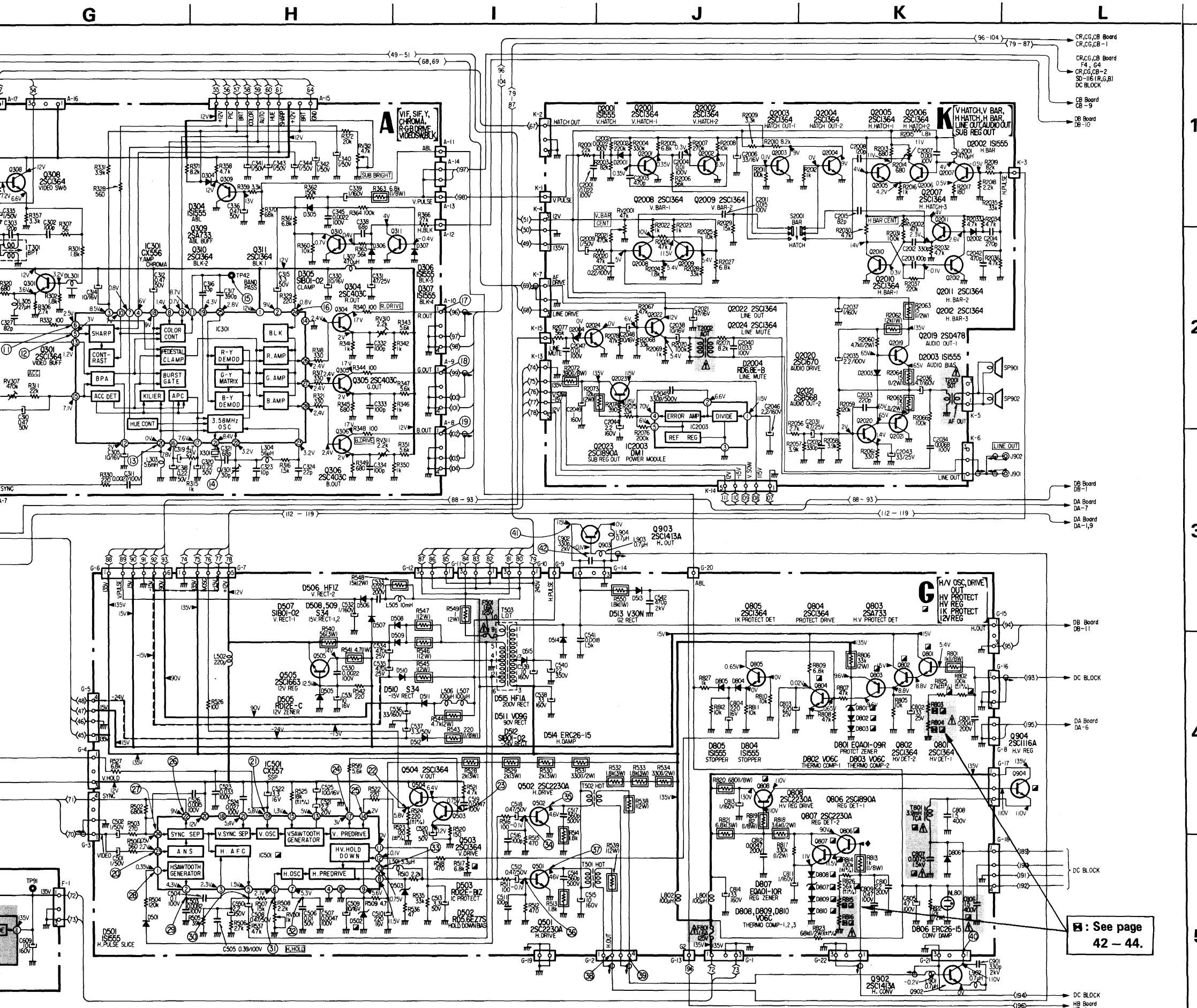
Part replaced (  )	Adjustment
G board, DC block R904, IC501, Q801, Q802, Q803, D502, D801, D802, D803, R517, R802, R803, R804, R809, R825, C806, C807, T801	HV HOLD DOWN ADJUSTMENT (R803/804) HV REG ADJUSTMENT (R815/816)
R905, Q806, Q807, D807, D808, D809, D810, R814, R815, R816, R826, Q808, Q904	HV REG ADJUSTMENT (R815/816)

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Reference numbers of the Q board differ from those indicated on the printed circuit board of the set.
- Read the reference numbers of the Q board by adding 1000 to those indicated.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 20,000-ohm-per-volt VOM.
  -  : adjustable without removing cabinet.
  -  : adjustment for repair.
- Readings are taken with a color-bar video signal input.
- Voltage variations may be noted due to normal production tolerances.
-  : B+ bus.
-  : When this portion is touched with the probe of a VOM, the set will be turned off. (Q806 base on G board)




















## 5-2. SCHEMATIC DIAGRAM (2/2)

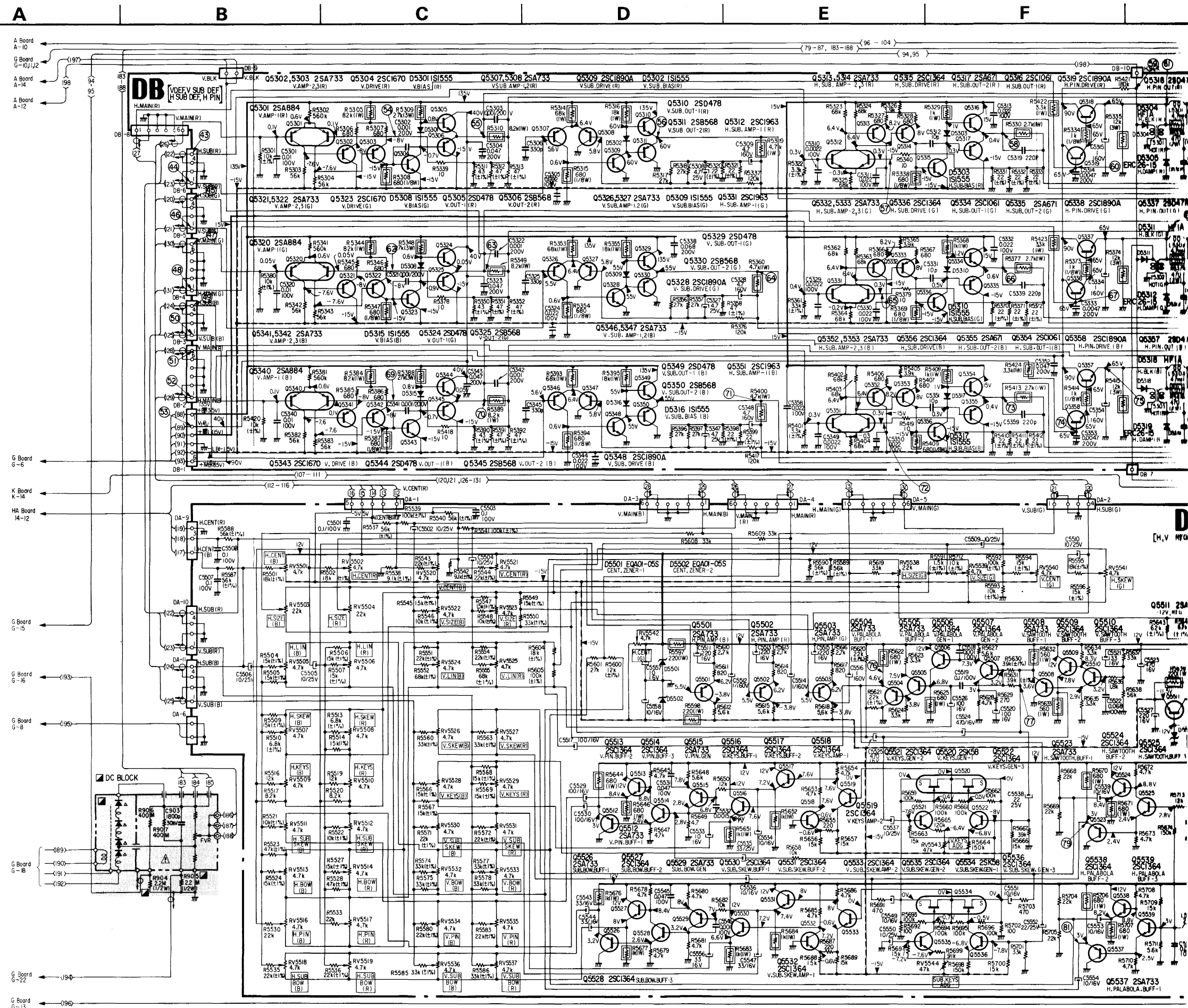
**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.

### Note:

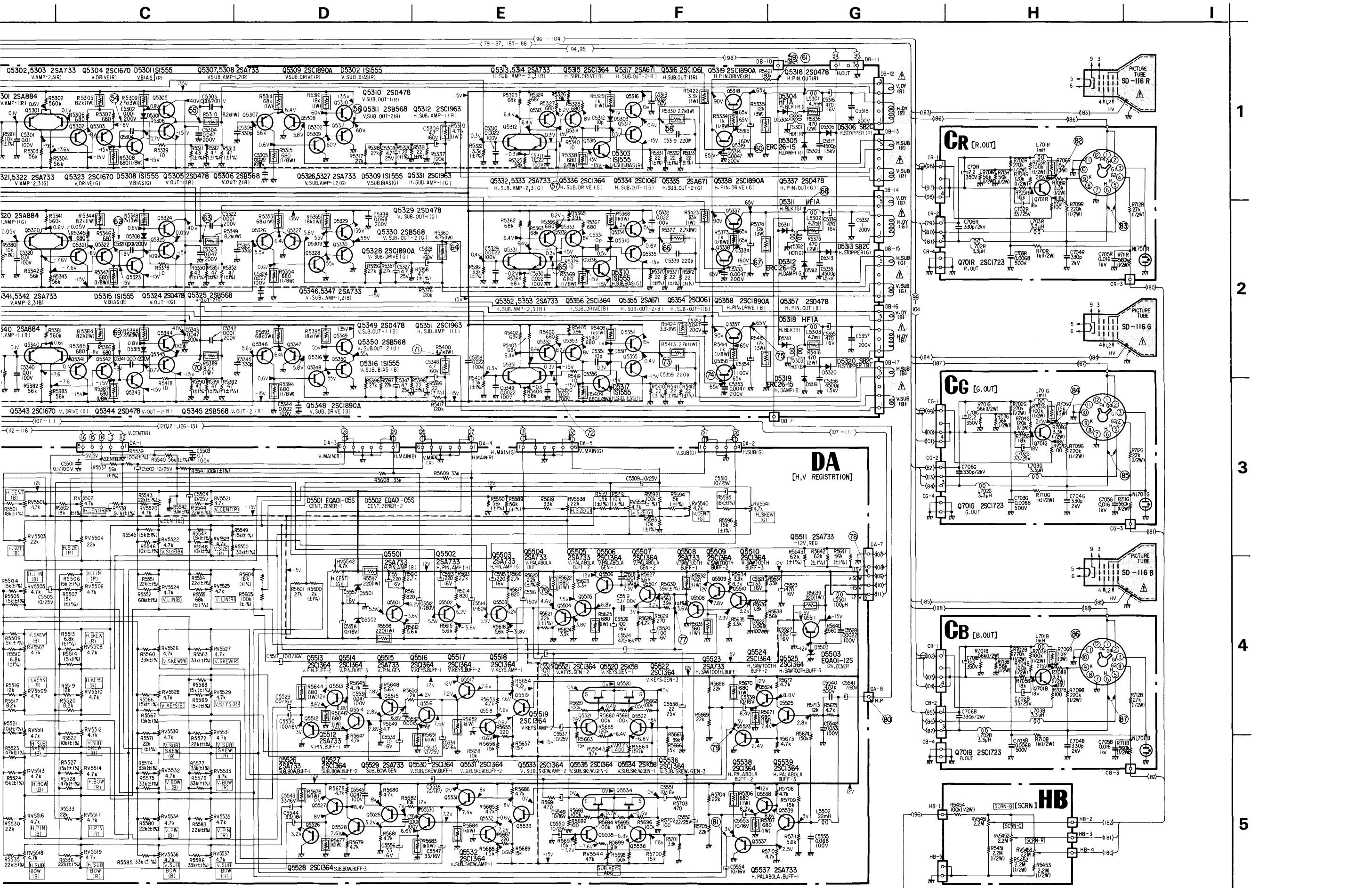
- All capacitors are in  $\mu\text{F}$  unless otherwise noted. p :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{2}\text{W}$  unless otherwise noted. k : 1000 $\Omega$ , M : 1000k $\Omega$
-  : nonflammable resistor.
-  : internal component.
-  : panel designation.
- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by  make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by  and repeat the adjustment until the specified value is achieved.  
(Refer to HV HOLD DOWN and HV REG Adjustments on page 42 - 44).
- When replacing the part in below table, be sure to perform the related adjustment.

Part replaced (  )	Adjustment
G board, DC block R904, IC501, Q801, Q802, Q803, D502, D801, D802, D803, R517, R802, R803, R804, R809, R825, C806, C807, R801	HV HOLD DOWN ADJUSTMENT (R803/804) HV REG ADJUSTMENT (R815/816)
R905, Q806, Q807, D807, D808, D809, D810, R814, R815, R816, R826, Q808, Q904	HV REG ADJUSTMENT (R815/816)

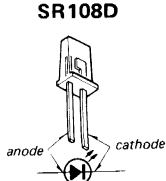
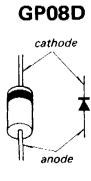
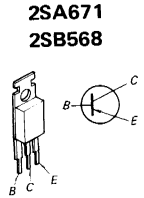
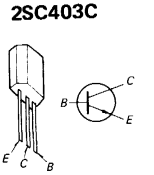
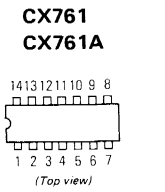
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Reference numbers of the Q board differ from those indicated on the printed circuit board of the set.
- Read the reference numbers of the Q board by adding 1000 to those indicated.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 20,000-ohm-per-volt VOM.
-  : adjustable without removing cabinet.
-  : adjustment for repair.
- Readings are taken with a color-bar video signal input.
- Voltage variations may be noted due to normal production tolerances.
-  : B+ bus.



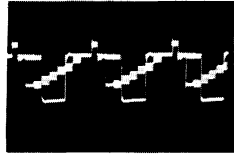




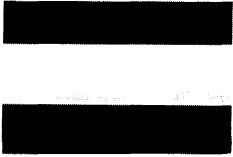
5-3. SEMICONDUCTORS



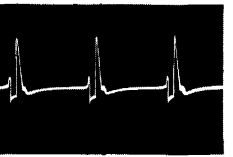
5-4. WAVEFORM



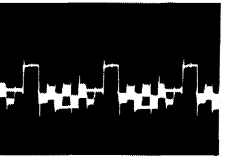
1 1.1Vp-p (H)



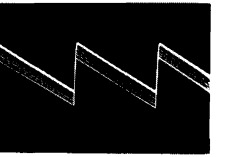
7 12.5Vp-p (H)



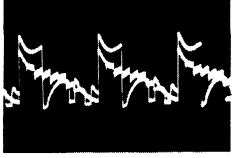
13 5.6Vp-p (H)



19 1.2Vp-p (H)



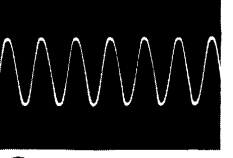
25 1.3Vp-p (V)



2 6Vp-p (H)



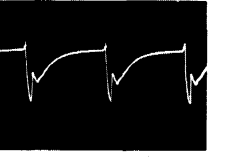
8 1.6Vp-p (H)



14 2Vp-p 3.58MHz



20 1.8Vp-p (H)



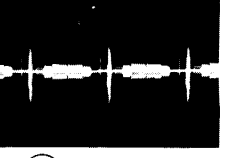
26 12Vp-p (H)



3 3Vp-p (H)



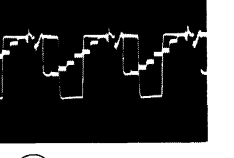
9 1.6Vp-p (H)



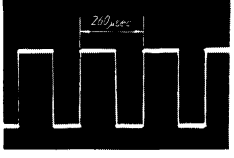
15 1.2Vp-p (H)



21 3.6Vp-p (V)



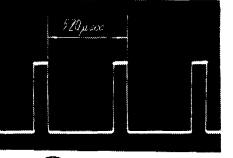
27 1.5Vp-p (H)



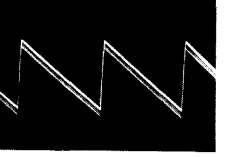
4 31Vp-p (H)



10 0.24Vp-p (H)



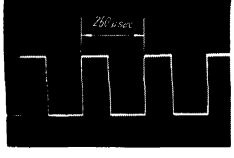
16 2.8Vp-p (H)



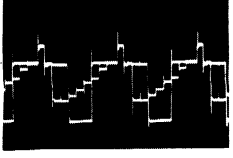
22 2Vp-p (V)



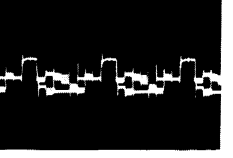
28 2.7Vp-p (H)



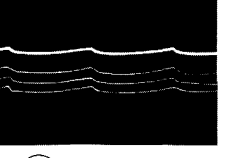
5 12Vp-p (H)



11 0.62Vp-p (H)



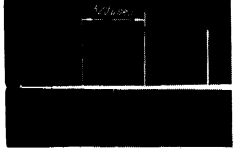
17 1Vp-p (H)



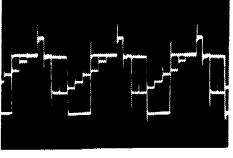
23 0.36Vp-p (V)



29 3.4Vp-p (H)



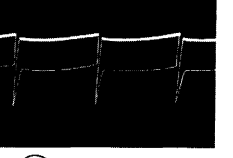
6 14Vp-p (H)



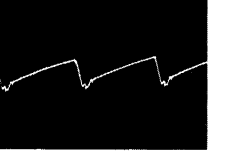
12 0.62Vp-p (H)



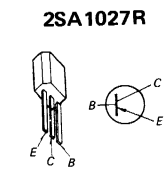
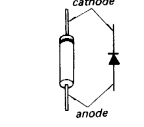
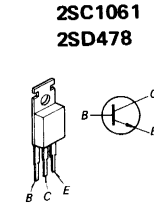
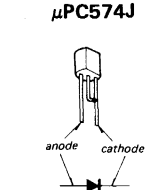
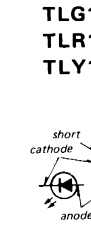
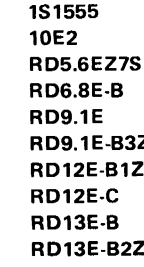
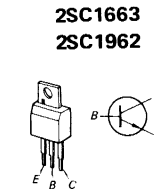
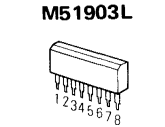
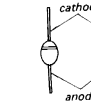
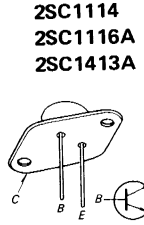
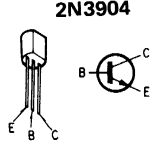
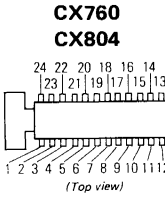
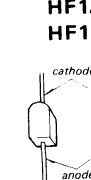
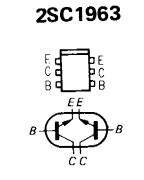
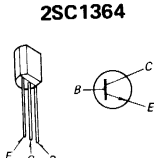
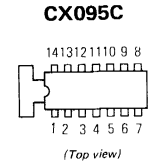
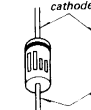
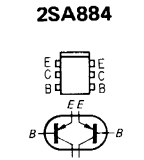
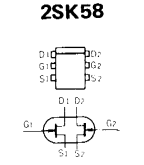
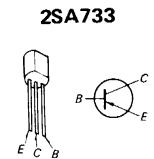
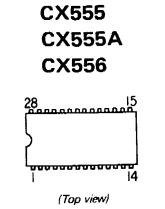
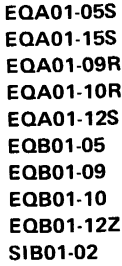
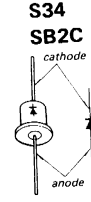
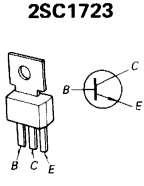
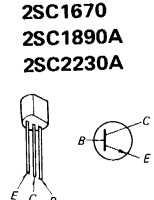
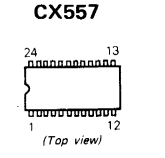
18 1.2Vp-p (H)

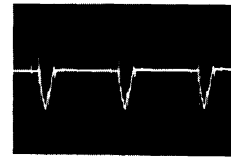


24 0.6Vp-p (V)

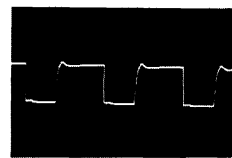


30 0.8Vp-p (H)





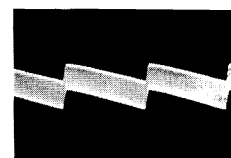
31) 0.5Vp-p (H)



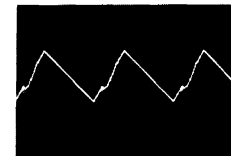
37) 85Vp-p (H)



43) 0.28Vp-p (V)



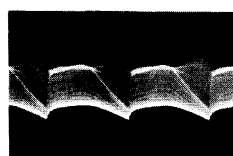
49) 0.16Vp-p (V)



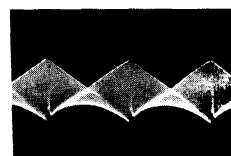
32) 2Vp-p (H)



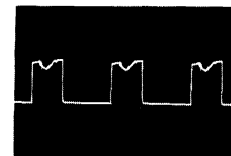
38) 17Vp-p (H)



44) 0.3Vp-p (H)



50) 0.26Vp-p (V)



33) 1.8Vp-p (H)



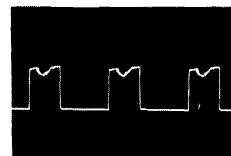
39) 17Vp-p (H)



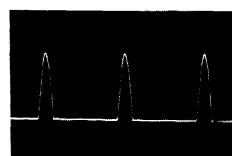
45) 0.04Vp-p (V)



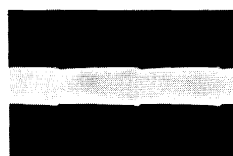
51) 2Vp-p (V)



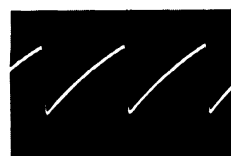
34) 1.6Vp-p (H)



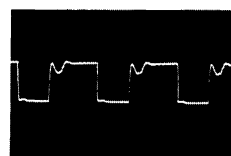
40) 920Vp-p (H)



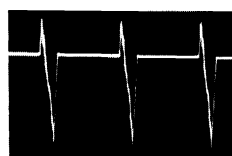
46) 0.8Vp-p (V)



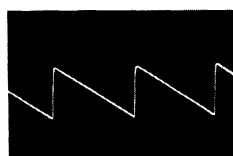
52) 5.6Vp-p (V)



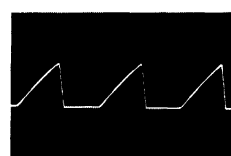
35) 82Vp-p (H)



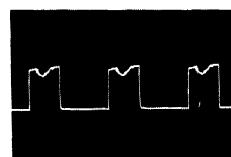
41) 520Vp-p (H)



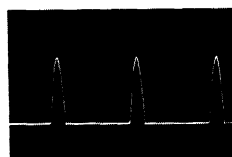
47) 2Vp-p (V)



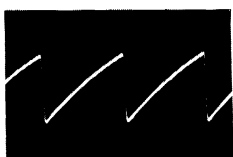
53) 90Vp-p (V)



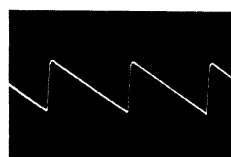
36) 1.6Vp-p (H)



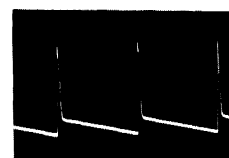
42) 920Vp-p (H)



48) 5.6Vp-p (V)



54) 2Vp-p (V)



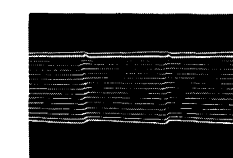
55) 76Vp-p (V)



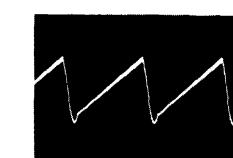
61) 9Vp-p (V)



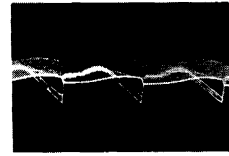
67) 9Vp-p (V)



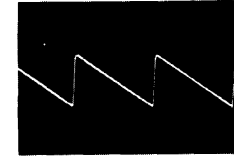
73) 15Vp-p (V)



79) 2.8Vp-p (H)



56) 19Vp-p (V)



62) 2.1Vp-p (V)



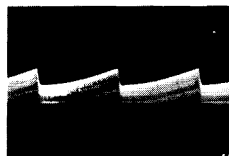
68) 9Vp-p (V)



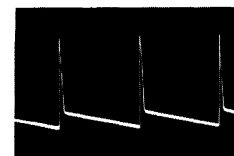
74) 9Vp-p (V)



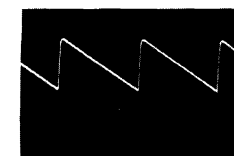
80) 70Vp-p (H)



57) 0.3Vp-p (V)



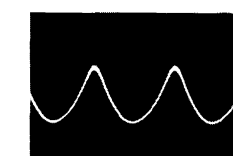
63) 80Vp-p (V)



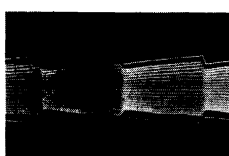
69) 2.1Vp-p (V)



75) 9Vp-p (V)



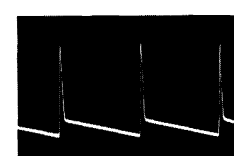
81) 2.4Vp-p (H)



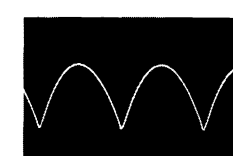
58) 14Vp-p (V)



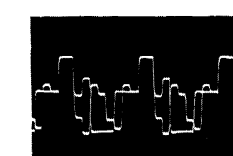
64) 9Vp-p (V)



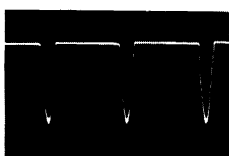
70) 80Vp-p (V)



76) 2.6Vp-p (V)



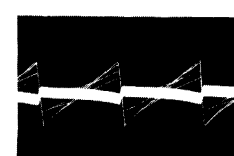
82) 64Vp-p (H)



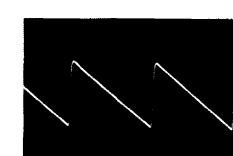
59) 66Vp-p (H)



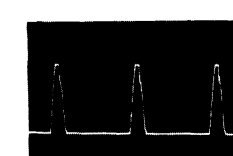
65) 0.04Vp-p (V)



71) 36Vp-p (V)



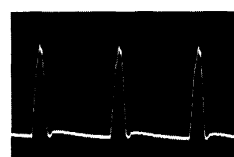
77) 2.6Vp-p (V)



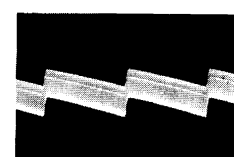
83) 28Vp-p (H)



60) 9Vp-p (V)



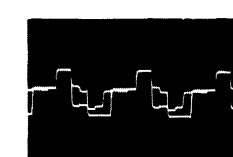
66) 3.8Vp-p (V)



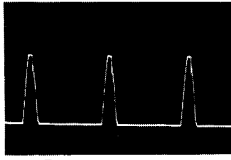
72) 0.4Vp-p (V)



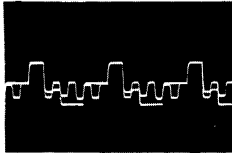
78) 2.8Vp-p (V)



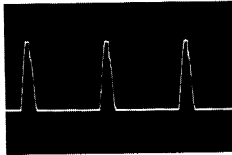
84) 90Vp-p (H)



85 28Vp-p (H)



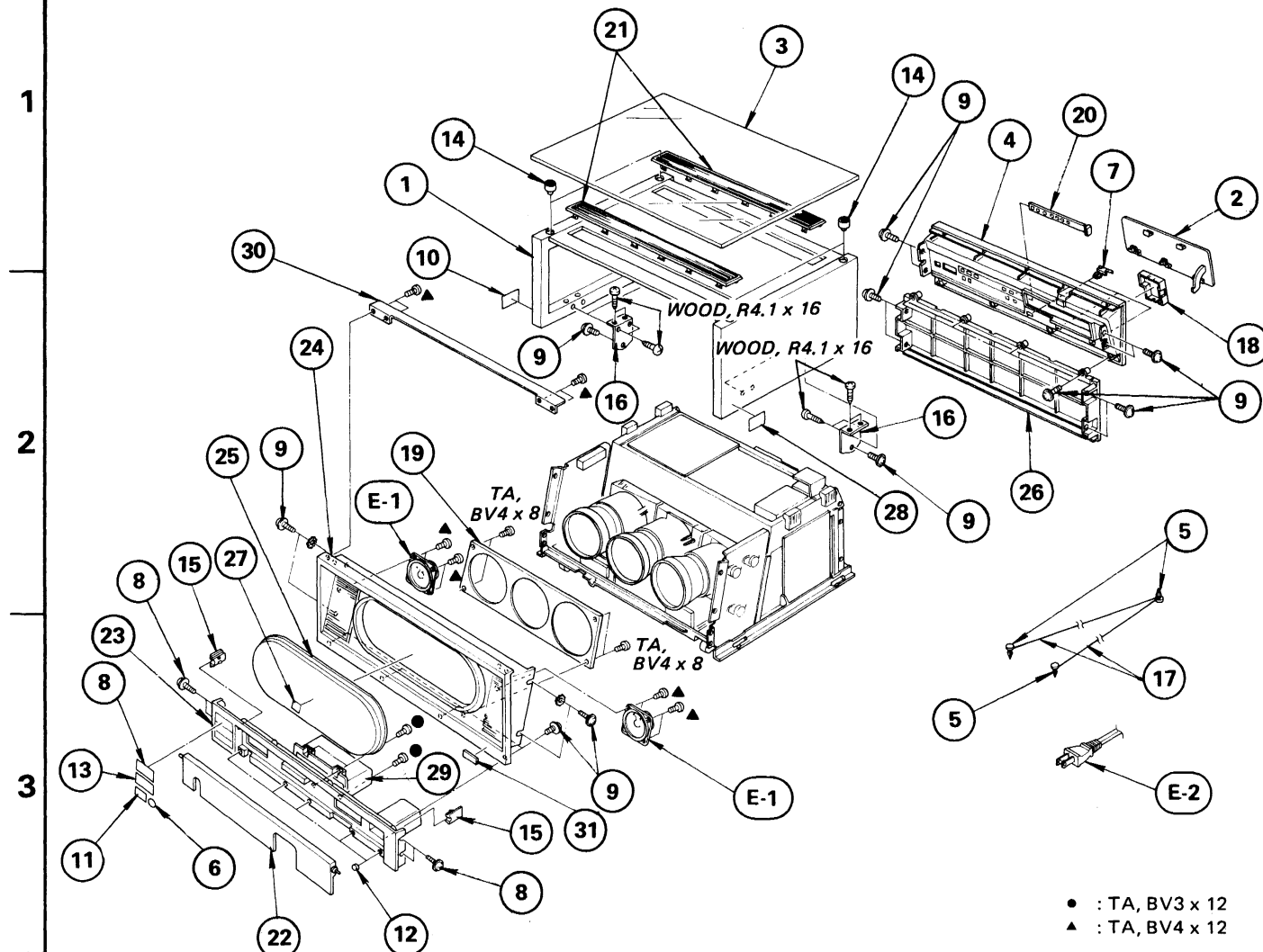
86 85Vp-p (H)



87 28Vp-p (H)

# SECTION 6 EXPLODED VIEWS

(1) CABINET



No.	Part No	Description	Remark	No.	Part No	Description	Remark
1	X-4346-402-0	CABINET ASSY		17	4-346-420-00	CORD (C), SET UP (KP-7220)	
2	X-4346-406-0	DOOR ASSY, CONTROL		17	4-346-421-00	CORD (B), SET UP (KP-5020)	
3	X-4346-409-0	GLASS ASSY, TOP		18	4-346-426-00	COVER, HATCH SWITCH	
4	X-4346-414-0	PANEL ASSY, CONTROL	2,6,17	19	4-346-443-00	COVER (C), MIRROR BARREL (KP-5020)	
5	3-641-283-00	CLIP, CANOE		19	4-346-453-00	COVER (B), MIRROR BARREL (KP-7220)	
6	3-701-915-01	LABEL, UL		20	4-346-448-00	HOLDER, LABEL	
7	3-703-035-11	SHAFT, LID		21	4-346-463-00	VENTILATION	
8	3-703-238-00	LABEL, MAIN CAUTION		22	4-346-464-00	DOOR, CONNECTOR	
9	3-703-251-00	SCREW (+M4), IT TAPPING		23	4-346-465-00	PANEL, REAR	
10	3-703-260-01	LABEL, MATERIAL		24	4-346-466-00	PANEL, LENS	
11	4-017-439-00	LABEL, X-RAY		25	4-346-468-00	COVER, LENS	
12	4-314-871-00	CUSHION		26	4-346-469-00	PANEL, UNDER	
13	4-346-402-00	LABEL, MODEL NUMBER (KP-7220)		27	4-346-473-00	LABEL, LENS COVER	
14	4-346-403-00	LABEL, MODEL NUMBER (KP-5020)		28	4-346-474-01	LABEL, SUB CAUTION	
15	4-346-411-00	CUSHION, GLASS		29	4-346-475-01	BOX, CORD	
16	4-346-412-00	RETAINER, DOOR		30	4-346-476-01	STAY, SUB, LENS PANEL	
	4-346-417-00	BRACKET (A), CABINET		31	4-849-833-00	EMBLEM, SONY	

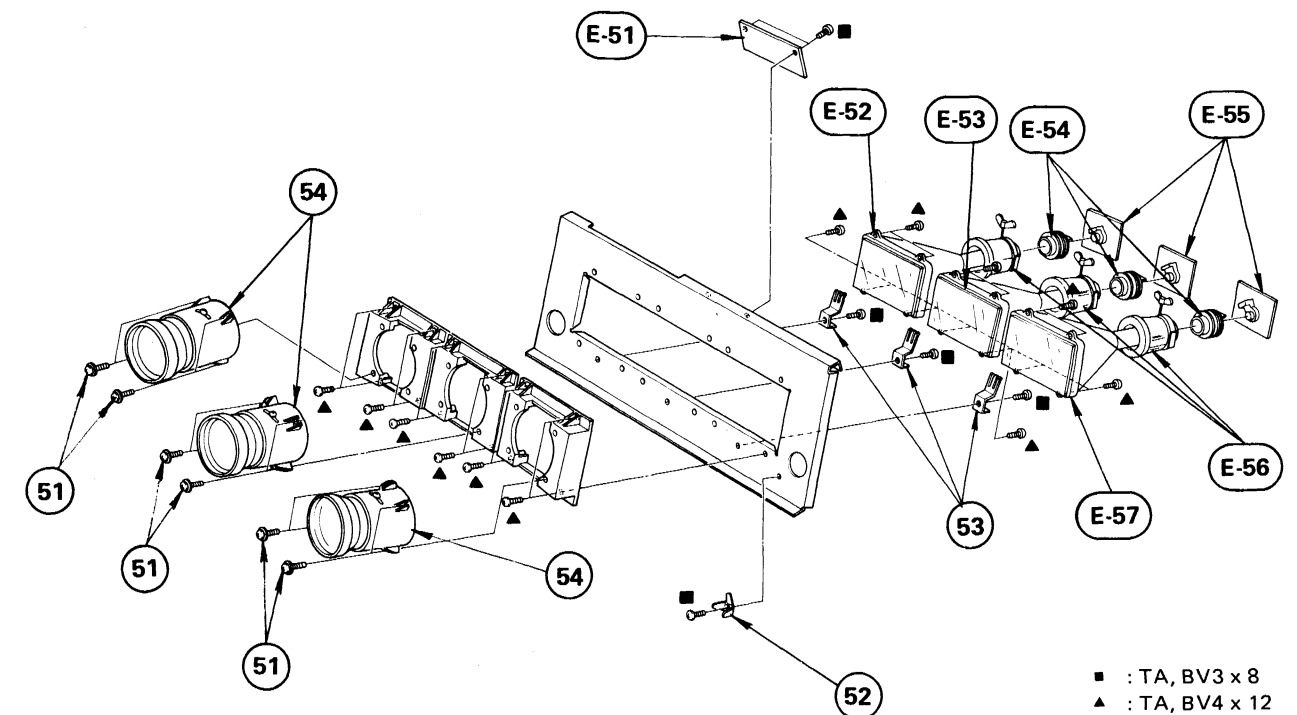
NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

(2) PICTURE TUBE



No.	Part No	Description	Remark	No.	Part No	Description	Remark
51	4-302-934-00	SCREW, TAPPING, +PW 4X12		53	4-332-209-00	SPRING	
52	4-303-793-00	TERMINAL, GROUND		54	4-346-401-00	DELTA (2), LENS	

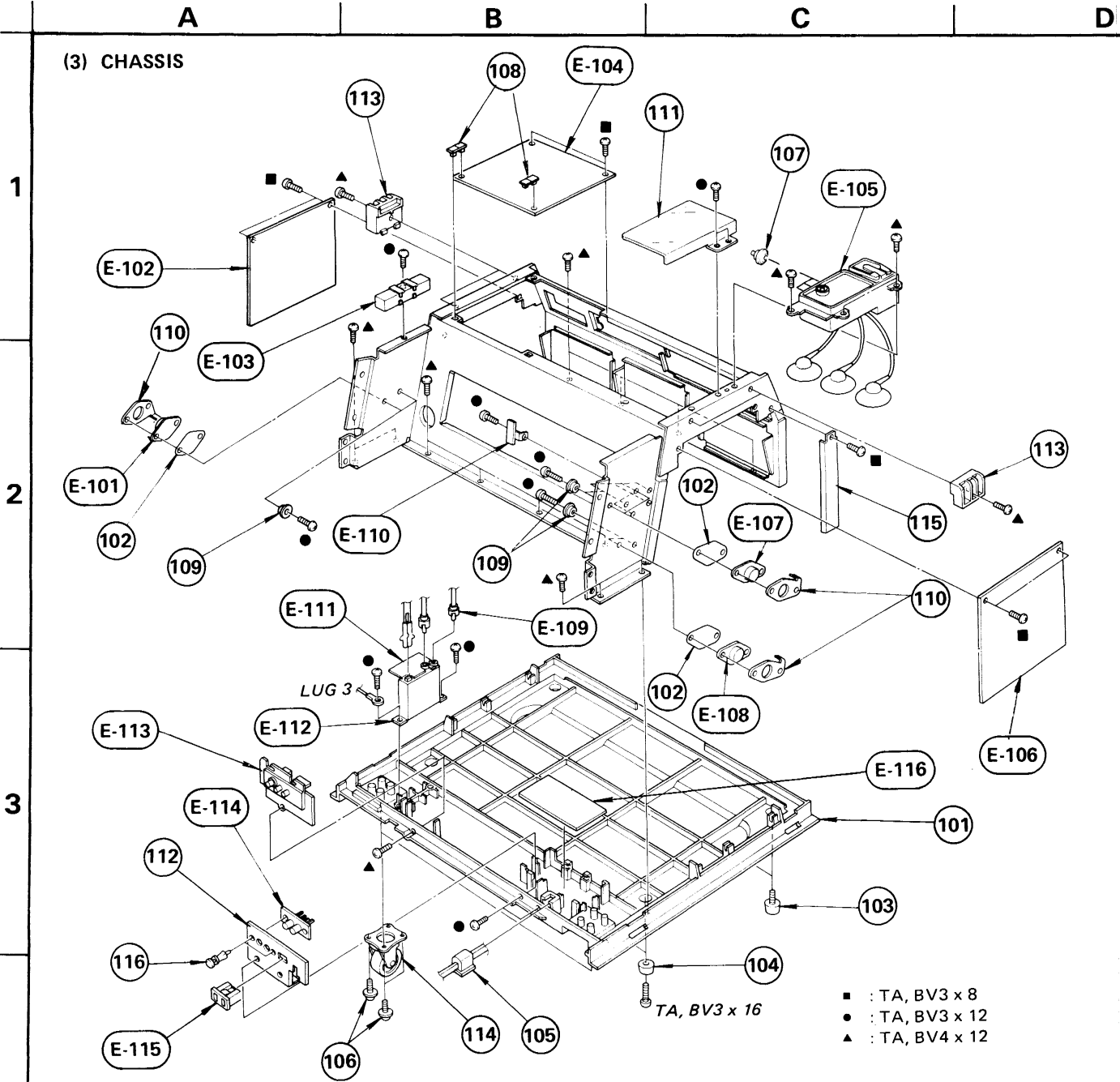
NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.





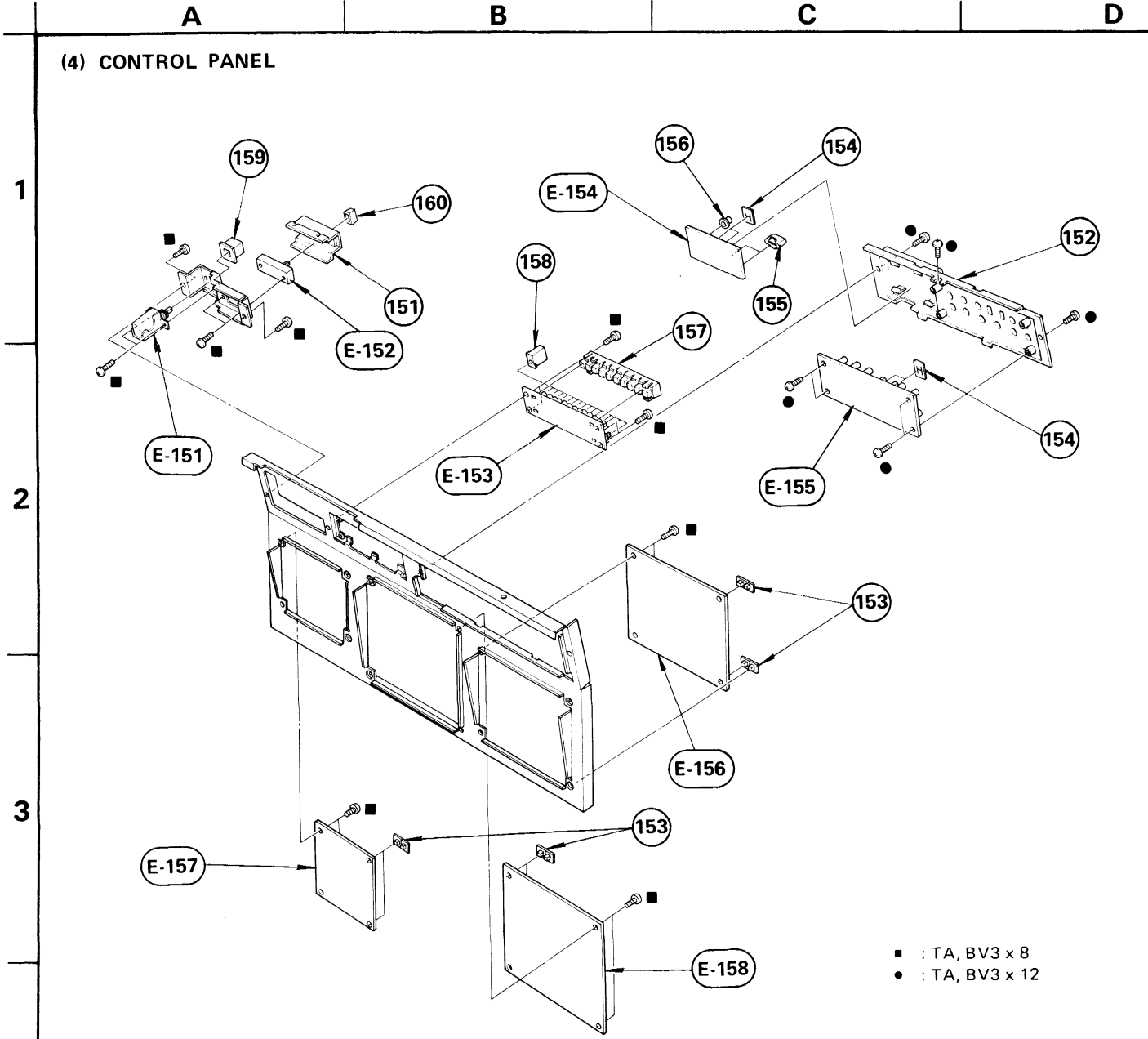
No.	Part No	Description	Remark	No.	Part No	Description	Remark
101	X-4346-415-0	BASE ASSY	103,104 106,114	109	4-313-734-00	BUSHING TR,Y	
102	3-701-353-00	SPACER, MICA		110	4-314-938-01	RETAINER (TO-3), TRANSISTOR	
103	3-703-369-00	ADJUSTOR		111	4-346-419-00	COVER, FBT	
104	3-703-370-00	FOOT, RUBBER		112	4-346-423-00	PLATE, TERMINAL, CONNECTOR	
105	4-022-115-00	HOLDER, AC CORD		113	4-346-431-00	HOLDER, CABINET	
106	4-302-934-00	TA, PW 4X12		114	4-346-435-00	CASTER	
107	4-308-858-00	CAP, LEAD, FC		115	4-346-436-00	STAY, G BRACKET	
108	4-313-732-00	CLIP, HINGE, CIRCUIT BOARD		116	4-812-134-00	RIVET NYLON, 3.5	

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



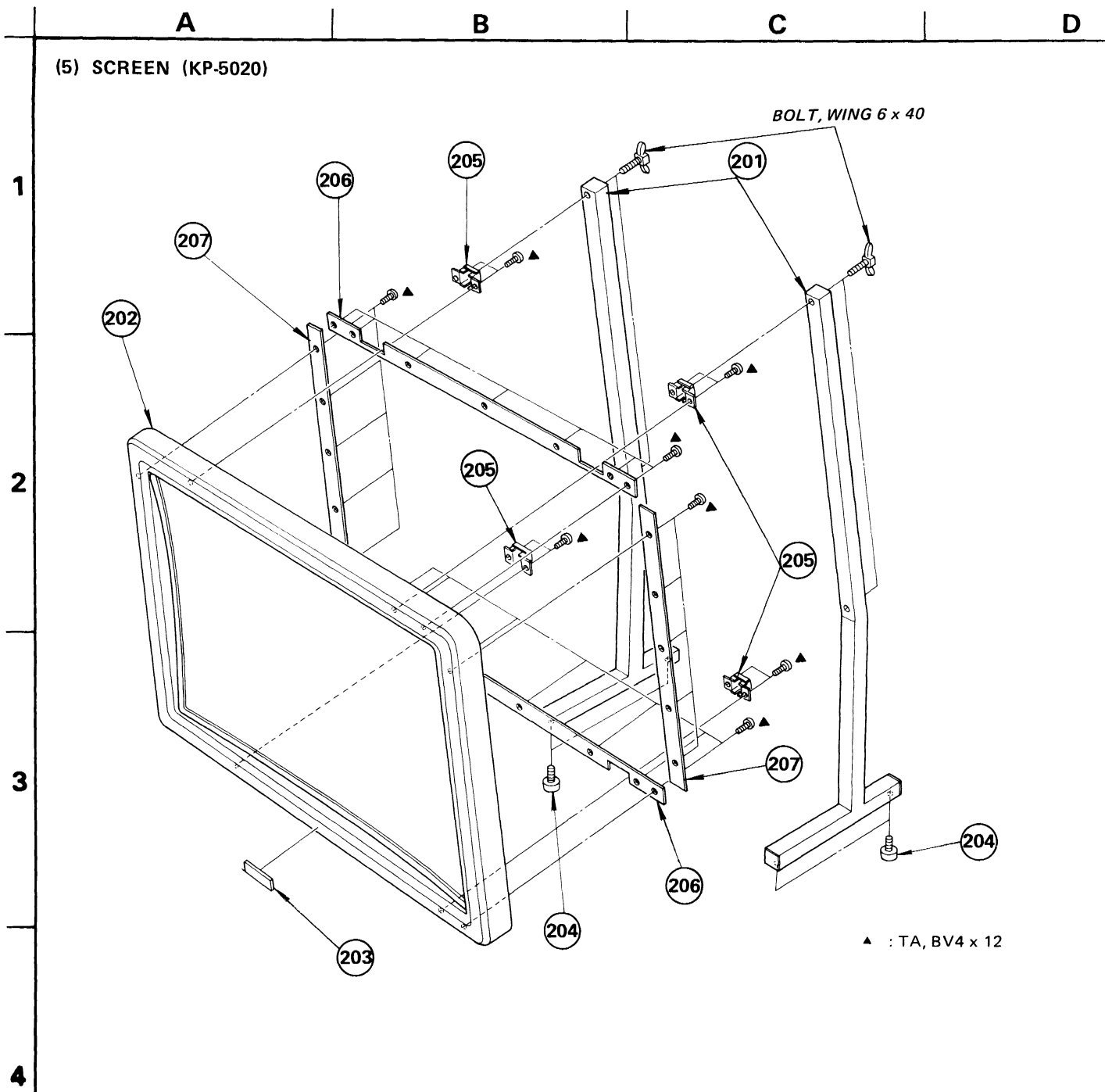
No.	Part No	Description	Remark	No.	Part No	Description	Remark
151	X-4346-403-0	BASE ASSY, SLIDE CONTROL		156	4-335-306-00	BUTTON, CLEAR	
152	4-4346-410-0	CASE ASSY, CONTROL		157	4-338-114-00	HOLDERN NEON LAMP	
153	4-313-732-00	CLIP, HINGE, CIRCUIT BOARD		158	4-346-408-00	BUTTON, TUNING	
154	4-314-869-00	INSULATOR,SLIDE SWITCH		159	4-346-409-00	BUTTON, POWER	
155	4-335-304-00	BUTTON, TUNING		160	4-346-410-00	KNOB, SLIDE CONTROL	

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



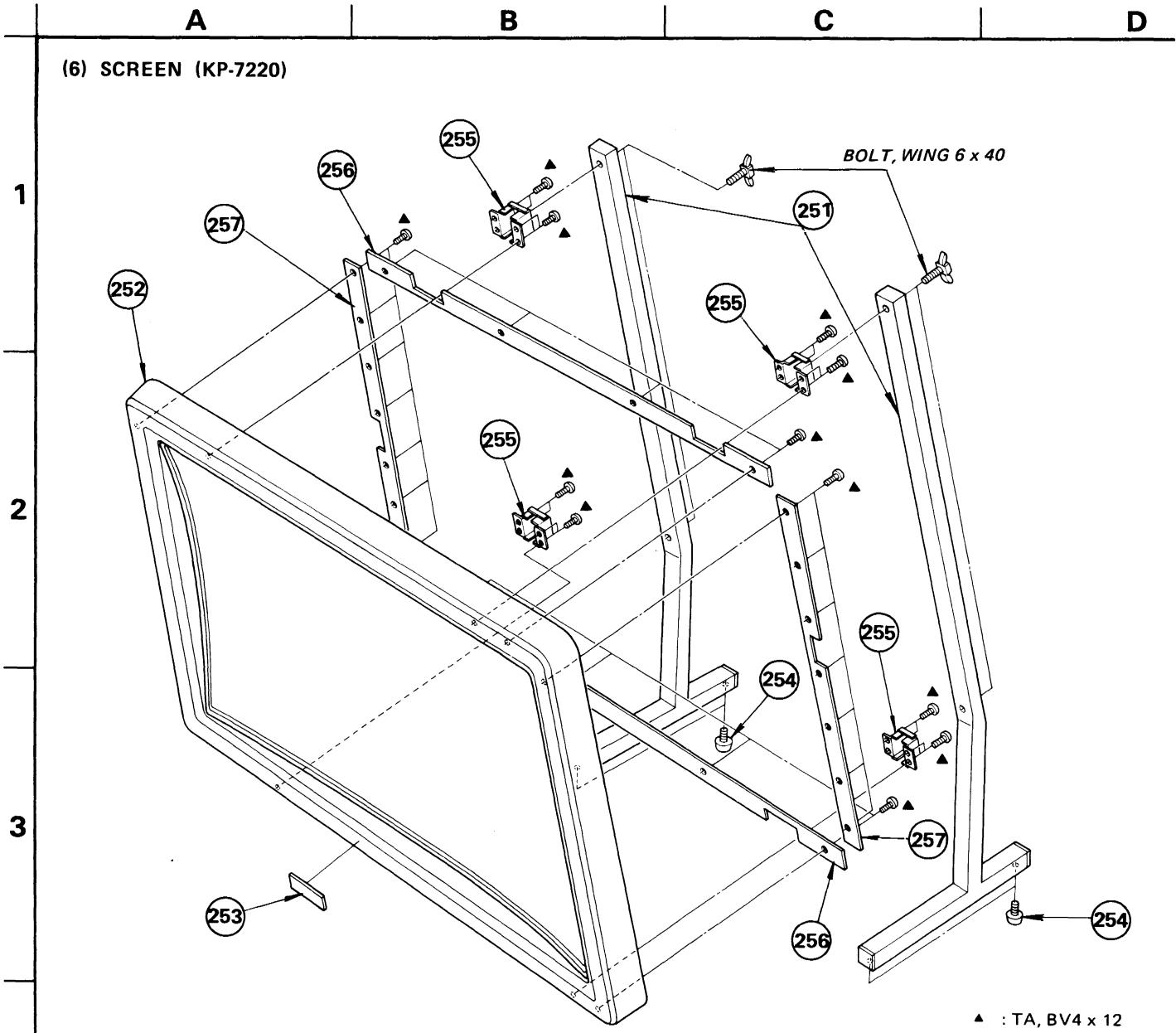
No.	Part No	Description	Remark	No.	Part No	Description	Remark
201	X-4346-405-0	POLE (B) ASSY, SCREEN	204	204	3-703-369-00	ADJUSTOR	
202	X-4346-411-0	SCREEN ASSY (B)	203,205	205	▲:4-346-414-00	BRACKET (B), SCREEN	
			206,207	206	▲:4-346-429-00	HOLDER (A), SCREEN	
203	3-651-703-00	EMBLEM, SONY		207	▲:4-346-430-00	HOLDER (B), SCREEN	

**NOTE:**

Items with no part number and no description are not stocked because they are seldom required for routine service. The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.



No.	Part No	Description	Remark	No.	Part No	Description	Remark
251	X-4346-408-0	POLE (C) ASSY, SCREEN		254	3-703-369-00	ADJUSTOR	
252	X-4346-412-0	SCREEN ASSY (C)		253,255	▲:4-346-415-00	BRACKET (C), SCREEN	
				256,257	▲:4-346-433-00	HOLDER (C), SCREEN	
253	3-651-703-00	EMBLEM, SONY		257	▲:4-346-434-00	HOLDER (D), SCREEN	

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

## SECTION 7

### ELECTRICAL PARTS LIST

A	F
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Ref.No	Part No	Description	Remark
▲:1-603-225-00	F BOARD		E-116
1-533-146-00	HOLDER, FUSE		
CAPACITOR			
C601 ▲:1-108-745-00	MYLAR	0.22MF	20% 125V
C602 ▲:1-108-745-00	MYLAR	0.22MF	20% 125V
C603 1-102-189-00	CERAMIC	0.0047MF	125V
C604 1-102-189-00	CERAMIC	0.0047MF	125V
C605 1-125-186-00	ELECT(BLOCK)	560MF	200V
C606 1-102-085-00	CERAMIC	0.0047MF	500V
C607 1-121-757-00	ELECT	33MF	160V
C608 1-102-030-00	CERAMIC	330PF	10% 500V
C609 1-121-999-00	ELECT	10MF	160V
DIODE			
D601 =>8-719-911-55	DIODE U05G		
D602 =>8-719-911-55	DIODE U05G		
D603 =>8-719-911-55	DIODE U05G		
D604 =>8-719-911-55	DIODE U05G		
D605 =>8-719-200-02	DIODE 10E2		
CONNECTOR			
F1 ▲:1-506-349-21	3P PLUG (L)		
F2 ▲:1-506-347-21	4P PLUG		
F3 ▲:1-506-371-00	2P PLUG (L)		
FUSE			
F601 ▲:1-532-272-11	FUSE		
F602 ▲:1-532-555-00	FUSE, GLASS TUBE		
IC			
IC601▲:1-231-443-00	MODUL, POWER		
COIL			
L601▲:1-407-365-00	COIL, CHOKE		
TRANSISTOR			
Q601 =>8-765-170-01	TRANSISTOR 2SC1962		
RESISTOR			
R601 ▲:1-202-665-15	COMPSITION	6.8M	5% 1/2W
R602 ▲:1-202-645-00	COMPSITION	1M	5% 1/2W
R603 ▲:1-205-589-00	CEMENT-COATED	1.8	10% 10W
R604 1-214-599-00	METAL	68K	5% 1W F
R605 1-206-688-00	METAL	10K	5% 2W F
R606 1-213-161-00	METAL	33K	5% 1W F
R607 1-246-521-00	CARBON	100K	5% 1/4W
R608 1-205-588-00	CEMENT-COATED	4.7	10% 7W
R609 1-246-991-00	CARBON	150	5% 1/8W F
R610 1-212-724-00	METAL	820K	1% 1/2W

Ref.No	Part No	Description	Remark
TRANSFORMER			
T601 ▲:1-421-259-00	COIL, LINE FILTER		
T602 ▲:1-421-259-00	COIL, LINE FILTER		
POST PIN			
TP91 ▲:1-536-354-00	POST PIN		
TP92 ▲:1-536-354-00	POST PIN		
TP93 ▲:1-536-354-00	POST PIN		
*****			
▲:A-1295-400-A	A BOARD, COMPLETE		E-158
▲:4-334-250-00	CASE, SHIELD (MAIN)		
▲:4-334-251-00	LID, UPPER, SHIELD CASE		
▲:4-334-252-00	LID, REAR, SHIELD CASE		
CONNECTOR			
A1 ▲:1-506-349-21	3P PLUG (L)		
A2 ▲:1-506-347-21	4P PLUG		
A7 ▲:1-508-766-00	4P PLUG (M)		
A8 ▲:1-508-766-00	4P PLUG (M)		
A9 ▲:1-508-766-00	4P PLUG (M)		
A10 ▲:1-508-766-00	4P PLUG (M)		
A12 ▲:1-508-784-00	1P PLUG		
A13 ▲:1-508-784-00	1P PLUG		
A14 ▲:1-508-786-00	2P PLUG (M)		
A15 ▲:1-560-224-00	PLUG, CONNECTOR (2.5MM) 10P		
A16 ▲:1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P		
A17 ▲:1-508-765-00	3P PLUG (M)		
A18 ▲:1-508-765-00	3P PLUG (M)		
A19 ▲:1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P		
A20 ▲:1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P		
A22 ▲:1-508-784-00	1P PLUG		
CAPACITOR			
C201 1-101-888-00	CERAMIC	68PF	5% 50V
C205 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C206 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C207 1-161-377-00	CERAMIC	0.0047MF	20% 50V
C208 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C209 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C211 1-108-638-00	MYLAR	0.1MF	10% 100V
C212 1-123-353-00	ELECT	2.2MF	20% 50V
C213 1-123-351-00	ELECT	0.47MF	20% 50V
C214 1-123-354-00	ELECT	3.3MF	20% 50V
C215 1-102-503-00	CERAMIC	3PF	0.25PF 50V
C216 1-102-503-00	CERAMIC	3PF	0.25PF 50V
C217 1-102-963-00	CERAMIC	33PF	5% 50V
C218 1-102-513-00	CERAMIC	18PF	5% 50V
C219 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C220 1-102-121-00	CERAMIC	0.0022MF	10% 50V
C221 1-123-316-00	ELECT	10MF	20% 16V

NOTE:

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

- =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

## CAPACITORS

• MF :  $\mu\text{F}$ , PF :  $\mu\mu\text{F}$

## RESISTORS

• All resistors are in ohms.

- F : nonflammable.

## COILS

• MMH : mH, UH :  $\mu$ H

A

Ref.No	Part No	Description		Remark	
C222	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C225	1-101-006-00	CERAMIC	0.047MF		50V
C226	1-161-295-00	CERAMIC	15PF	5%	50V
C228	1-123-352-00	ELECT	1MF	20%	50V
C229	1-101-118-00	CERAMIC	0.01MF	20%	50V
C230	1-102-114-00	CERAMIC	470PF	10%	50V
C231	1-108-628-11	MYLAR	0.015MF	10%	100V
C232	1-123-351-00	ELECT	0.47MF	20%	50V
C233	1-123-324-00	ELECT	1000MF	20%	16V
C234	1-123-316-00	ELECT	10MF	20%	16V
C239	1-123-316-00	ELECT	10MF	20%	16V
C240	1-102-496-00	CERAMIC	82PF	5%	50V
C241	1-102-518-00	CERAMIC	33PF	5%	50V
C242	1-102-494-00	CERAMIC	68PF	5%	50V
C244	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C245	1-161-279-00	CERAMIC	10PF	5%	50V
C246	1-123-316-00	ELECT	10MF	20%	16V
C250	1-108-630-11	MYLAR	0.022MF	10%	100V
C251	1-161-323-00	CERAMIC	0.001MF	10%	50V
C302	1-161-271-00	CERAMIC	100PF	5%	50V
C303	1-102-816-00	CERAMIC	120PF	5%	50V
C304	1-123-316-00	ELECT	10MF	20%	16V
C305	1-123-316-00	ELECT	10MF	20%	16V
C308	1-101-004-00	CERAMIC	0.01MF		50V
C309	1-102-820-00	CERAMIC	330PF	5%	50V
C310	1-123-351-00	ELECT	0.47MF	20%	50V
C311	1-108-619-00	MYLAR	0.0027MF	10%	100V
C312	1-123-351-00	ELECT	0.47MF	20%	50V
C314	1-123-316-00	ELECT	10MF	20%	16V
C315	1-123-354-00	ELECT	3.3MF	20%	50V
C316	1-102-963-00	CERAMIC	33PF	5%	50V
C317	1-102-822-00	CERAMIC	390PF	5%	50V
C318	1-123-447-00	ELECT	0.22MF	20%	50V
C319	1-123-328-00	ELECT	4.7MF	20%	25V
C320	1-123-447-00	ELECT	0.22MF	20%	50V
C321	1-101-888-00	CERAMIC	68PF	5%	50V
C323	1-102-947-00	CERAMIC	10PF	5%	50V
C324	1-102-959-00	CERAMIC	22PF	5%	50V
C327	1-161-270-00	CERAMIC	82PF	5%	50V
C328	1-102-973-00	CERAMIC	100PF	5%	50V
C330	1-123-316-00	ELECT	10MF	20%	16V
C331	1-123-332-00	ELECT	47MF	20%	25V
C332	1-102-106-00	CERAMIC	100PF	10%	50V
C333	1-102-106-00	CERAMIC	100PF	10%	50V
C334	1-102-106-00	CERAMIC	100PF	10%	50V
C335	1-123-352-00	ELECT	1MF	20%	50V
C336	1-123-351-00	ELECT	0.47MF	20%	50V
C338	1-101-888-00	CERAMIC	68PF	5%	50V
C339	1-123-252-00	ELECT	1MF		160V
C340	1-123-352-00	ELECT	1MF	20%	50V
C341	1-123-352-00	ELECT	1MF	20%	50V
C342	1-123-352-00	ELECT	1MF	20%	50V
C343	1-123-352-00	ELECT	1MF	20%	50V

Ref.No	Part No	Description	Remark		
C344	1-123-352-00	ELECT	1MF	20%	50V
C345	1-108-618-11	MYLAR	0.0022MF	10%	100V
FILTER					
CF201	1-527-260-00	CERAMIC FILTER			
CF202	1-409-332-00	CERAMIC TRAP			
TRIMMER					
CV301	1-141-212-00	CAP, TRIMMER			
DIODE					
D201	8-719-815-55	DIODE	1S1555		
D202	8-719-113-07	DIODE	RD13E-B		
D203	8-719-815-55	DIODE	1S1555		
D204	8-719-815-55	DIODE	1S1555		
D205	8-719-815-55	DIODE	1S1555		
D301	8-719-815-55	DIODE	1S1555		
D302	8-719-815-55	DIODE	1S1555		
D303	8-719-815-55	DIODE	1S1555		
D304	8-719-815-55	DIODE	1S1555		
D305	=>8-719-200-02	DIODE	10E2		
D306	8-719-815-55	DIODE	1S1555		
D307	8-719-815-55	DIODE	1S1555		
DELAY LINE					
DL301	1-415-164-00	DELAY LINE (WITH TRAP)			
IC					
IC201	8-759-600-95	IC	CX-095C		
IC202	8-759-600-05	IC	CX-555A		
IC301	8-759-105-56	IC	CX-556		
SOCKET PLUG					
J201	1-526-575-00	SOCKET, PLUG			
COIL					
L201	1-407-694-11	MICRO INDUCTOR 12UH			
L202	1-425-613-00	COIL,AIR-CORE,QF TYPE			
L203	1-407-692-11	MICRO INDUCTOR 8.2UH			
L205	1-407-701-11	MICRO INDUCTOR 47UH			
L209	1-407-705-11	MICRO INDUCTOR 100UH			
L302	1-407-698-11	MICRO INDUCTOR 27UH			
L303	1-407-203-51	MICRO INDUCTOR 5.6MMH			
L304	1-407-702-11	MICRO INDUCTOR 56UH			
L305	1-407-698-11	MICRO INDUCTOR 27UH			
L307	1-407-713-11	MICRO INDUCTOR 470UH			
TRANSISTOR					
Q202	8-729-663-47	TRANSISTOR 2SC1364			
Q203	=>8-765-170-01	TRANSISTOR 2SC1962			
Q301	8-729-663-47	TRANSISTOR 2SC1364			
Q304	8-724-375-01	TRANSISTOR 2SC403C			

Ref.No	Part No	Description				Remark
Q305	8-724-375-01	TRANSISTOR	2SC403C			
Q306	8-724-375-01	TRANSISTOR	2SC403C			
Q307	8-729-663-47	TRANSISTOR	2SC1364			
Q308	8-729-663-47	TRANSISTOR	2SC1364			
Q309	=>8-729-612-77	TRANSISTOR	2SA1027R			
Q310	8-729-663-47	TRANSISTOR	2SC1364			
Q311	8-729-663-47	TRANSISTOR	2SC1364			
RESISTOR						
R201	1-246-431-00	CARBON	18	5%	1/4W	
R203	1-246-422-00	CARBON	7.5	5%	1/4W	
R208	1-246-481-00	CARBON	2.2K	5%	1/4W	
R209	1-246-497-00	CARBON	10K	5%	1/4W	
R210	1-246-463-00	CARBON	390	5%	1/4W	
R214	1-246-457-00	CARBON	220	5%	1/4W	
R215	1-246-461-00	CARBON	330	5%	1/4W	
R216	1-246-483-00	CARBON	2.7K	5%	1/4W	
R217	1-246-519-00	CARBON	82K	5%	1/4W	
R218	1-246-473-00	CARBON	1K	5%	1/4W	
R219	1-246-505-00	CARBON	22K	5%	1/4W	
R220	1-246-517-00	CARBON	68K	5%	1/4W	
R221	1-246-469-00	CARBON	680	5%	1/4W	
R222	1-246-473-00	CARBON	1K	5%	1/4W	
R224	1-246-465-00	CARBON	470	5%	1/4W	
R226	1-246-475-00	CARBON	1.2K	5%	1/4W	
R234	1-246-457-00	CARBON	220	5%	1/4W	
R235	1-246-451-00	CARBON	120	5%	1/4W	
R236	1-246-481-00	CARBON	2.2K	5%	1/4W	
R237	1-246-984-11	CARBON	22	5%	1/8W F	
R238	1-246-477-00	CARBON	1.5K	5%	1/4W	
R239	1-246-489-00	CARBON	4.7K	5%	1/4W	
R240	1-246-485-00	CARBON	3.3K	5%	1/4W	
R241	1-246-489-00	CARBON	4.7K	5%	1/4W	
R243	1-206-529-00	METAL	56	5%	3W F	
R244	1-212-368-00	METAL	4.7	5%	1W F	
R247	1-246-473-00	CARBON	1K	5%	1/4W	
R250	1-213-147-00	METAL	2.2K	5%	1W F	
R301	1-246-479-00	CARBON	1.8K	5%	1/4W	
R302	1-246-479-00	CARBON	1.8K	5%	1/4W	
R306	1-246-483-00	CARBON	2.7K	5%	1/4W	
R307	1-246-443-00	CARBON	56	5%	1/4W	
R310	1-246-469-00	CARBON	680	5%	1/4W	
R311	1-246-505-00	CARBON	22K	5%	1/4W	
R315	1-246-473-00	CARBON	1K	5%	1/4W	
R316	1-246-477-00	CARBON	1.5K	5%	1/4W	
R317	1-246-461-00	CARBON	330	5%	1/4W	
R318	1-246-461-00	CARBON	330	5%	1/4W	
R320	1-246-469-00	CARBON	680	5%	1/4W	
R321	1-246-461-00	CARBON	330	5%	1/4W	
W328	1-246-467-00	CARBON	560	5%	1/4W	
W329	1-246-457-00	CARBON	220	5%	1/4W	
W330	1-246-457-00	CARBON	220	5%	1/4W	
W331	1-246-487-00	CARBON	3.9K	5%	1/4W	

Ref.No	Part No	Description	Remark		
R332	1-246-449-00	CARBON	100	5%	1/4W
R340	1-246-449-00	CARBON	100	5%	1/4W
R341	1-246-467-00	CARBON	560	5%	1/4W
R342	1-246-467-00	CARBON	560	5%	1/4W
R343	1-246-487-00	CARBON	3.9K	5%	1/4W
R344	1-246-449-00	CARBON	100	5%	1/4W
R345	1-246-467-00	CARBON	560	5%	1/4W
R346	1-246-467-00	CARBON	560	5%	1/4W
R347	1-246-487-00	CARBON	3.9K	5%	1/4W
R348	1-246-449-00	CARBON	100	5%	1/4W
R349	1-246-467-00	CARBON	560	5%	1/4W
R350	1-246-467-00	CARBON	560	5%	1/4W
R351	1-246-487-00	CARBON	3.9K	5%	1/4W
R352	1-246-509-00	CARBON	33K	5%	1/4W
R353	1-246-481-00	CARBON	2.2K	5%	1/4W
R354	1-246-497-00	CARBON	10K	5%	1/4W
R355	1-246-485-00	CARBON	3.3K	5%	1/4W
R356	1-246-509-00	CARBON	33K	5%	1/4W
R357	1-246-485-00	CARBON	3.3K	5%	1/4W
R358	1-246-489-00	CARBON	4.7K	5%	1/4W
R359	1-246-485-00	CARBON	3.3K	5%	1/4W
R360	1-246-497-00	CARBON	10K	5%	1/4W
R361	1-246-493-00	CARBON	6.8K	5%	1/4W
R362	1-246-525-00	CARBON	150K	5%	1/4W
R363	1-211-471-00	CARBON	6.8K	5%	1/8W
R364	1-246-521-00	CARBON	100K	5%	1/4W
R365	1-246-515-00	CARBON	56K	5%	1/4W
R366	1-246-507-00	CARBON	27K	5%	1/4W
R370	1-246-517-00	CARBON	68K	5%	1/4W
R371	1-246-495-00	CARBON	8.2K	5%	1/4W
R372	1-246-504-00	CARBON	20K	5%	1/4W
VARIABLE RESISTOR					
RV201	1-222-518-12	RES, ADJ, CARBON	4.7K		
RV202	1-222-518-12	RES, ADJ, CARBON	4.7K		
RV307	1-224-552-00	RES, ADJ, CARBON	470K		
RV308	1-222-518-12	RES, ADJ, CARBON	4.7K		
RV310	1-222-785-12	RES, ADJ, CARBON	2.2K		
RV311	1-222-785-12	RES, ADJ, CARBON	2.2K		
RV312	1-222-518-12	RES, ADJ, CARBON	4.7K		
TRANSFORMER					
T201	1-409-319-00	COIL, TRAP			
T202	1-409-318-00	COIL, TRAP			
T203	1-404-181-00	COIL, VIF			
T204	1-404-182-00	COIL, VIF			
T205	1-404-181-00	COIL, VIF			
T206	1-403-360-00	COIL, SIF			
T207	1-403-871-00	SIFT-2 COIL			
T208	1-404-179-00	FILTER, HELICAL			
T301	1-425-995-00	TRANSFORMER, INPUT			

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MB

Ref.No	Part No	Description	Remark
POST PIN			
TP12	▲:1-536-354-00	POST PIN	
TP15	▲:1-536-354-00	POST PIN	
TP16	▲:1-536-354-00	POST PIN	
TP42	▲:1-536-354-00	POST PIN	
TP93	▲:1-536-354-00	POST PIN	
CRYSTAL			
X301	1-527-396-00	CRYSTAL, OSC	
*****			
▲:1-603-230-00	MJ BOARD		E-154
CAPACITOR			
C2201	1-123-353-00	ELECT 2.2MF 20% 50V	
C2202	1-123-352-00	ELECT 1MF 20% 50V	
DIODE			
D2201	8-719-101-08	DIODE SR108D	
D2202	8-719-101-08	DIODE SR108D	
D2203	8-719-101-08	DIODE SR108D	
D2204	8-719-101-08	DIODE SR108D	
D2205	8-719-101-08	DIODE SR108D	
D2206	8-719-812-41	DIODE TLR124	
D2207	8-719-812-42	DIODE TLY124	
D2208	8-719-812-43	DIODE TLG124	
IC			
IC2201	8-759-619-03	IC M51903L	
RESISTOR			
R2200	1-246-497-00	CARBON 10K 5% 1/4W	
R2201	1-246-469-00	CARBON 680 5% 1/4W	
R2202	1-246-469-00	CARBON 680 5% 1/4W	
R2203	1-246-469-00	CARBON 680 5% 1/4W	
R2204	1-246-469-00	CARBON 680 5% 1/4W	
R2205	1-246-469-00	CARBON 680 5% 1/4W	
R2206	1-246-449-00	CARBON 100 5% 1/4W	
R2207	1-246-485-00	CARBON 3.3K 5% 1/4W	
SWITCH			
S2201	1-552-656-00	SWITCH, SLIDE	
S2202	1-552-656-00	SWITCH, SLIDE	
S2203	1-552-774-00	SWITCH, PUSH	
S2204	1-552-774-00	SWITCH, PUSH	
S2205	1-552-774-00	SWITCH, PUSH	
S2206	1-552-437-00	SWITCH, LEVER	

Ref.No	Part No	Description	Remark
▲:1-603-229-00	M BOARD		E-153
1-519-154-00	LAMP, NEON		
▲:4-338-114-00	HOLDER, NEON LAMP		
SWITCH			
S2251	1-553-437-00	SWITCH, PUSH (TUNING) (14 KEY)	
*****			
▲:A-1306-100-A	MB BOARD, COMPLETE		E-157
▲:1-555-349-00	CONNECTOR, MINIATURE 1P		
▲:4-334-331-00	LID, BOTTOM, SHIELD CASE		
▲:4-334-332-00	CASE (MAIN), SHIELD		
▲:4-334-333-00	LID, UPPER, SHIELD CASE		
CAPACITOR			
C012	1-101-006-00	CERAMIC 0.047MF 50V	
C031	1-123-355-00	ELECT 4.7MF 20% 50V	
C032	1-102-123-00	CERAMIC 0.0033MF 10% 50V	
C033	1-123-355-00	ELECT 4.7MF 20% 50V	
C034	1-101-880-00	CERAMIC 47PF 5% 50V	
C035	1-108-638-00	MYLAR 0.1MF 10% 100V	
C036	1-102-971-00	CERAMIC 82PF 5% 50V	
C037	1-101-006-00	CERAMIC 0.047MF 50V	
C038	1-130-020-00	FILM 0.0015MF 5% 50V	
C039	1-130-018-00	FILM 0.001MF 5% 50V	
C040	1-130-018-00	FILM 0.001MF 5% 50V	
C041	1-102-973-00	CERAMIC 100PF 5% 50V	
C042	1-101-884-00	CERAMIC 56PF 5% 50V	
C044	1-108-642-11	MYLAR 0.22MF 10% 100V	
C046	1-123-355-00	ELECT 4.7MF 20% 50V	
C047	1-102-973-00	CERAMIC 100PF 5% 50V	
C048	1-102-129-00	CERAMIC 0.01MF 10% 50V	
C049	1-123-318-00	ELECT 33MF 20% 16V	
C050	1-123-320-00	ELECT 100MF 20% 16V	
C051	1-123-316-00	ELECT 10MF 20% 16V	
C052	1-108-692-11	MYLAR 0.01MF 10% 200V	
C054	1-108-692-11	MYLAR 0.01MF 10% 200V	
C056	1-108-692-11	MYLAR 0.01MF 10% 200V	
C057	1-123-355-00	ELECT 4.7MF 20% 50V	
C058	1-102-980-00	CERAMIC 270PF 5% 50V	
C060	1-102-125-00	CERAMIC 0.0047MF 10% 50V	
C061	1-108-626-11	MYLAR 0.01MF 10% 100V	
C062	1-123-316-00	ELECT 10MF 20% 16V	
C063	1-108-634-11	MYLAR 0.047MF 10% 100V	
C099	1-123-252-00	ELECT 1MF 160V	
DIODE			
D030	8-719-815-55	DIODE 1S1555	
D033	8-719-815-55	DIODE 1S1555	
D034	8-719-815-55	DIODE 1S1555	
D035	8-719-815-55	DIODE 1S1555	
D038	8-719-815-55	DIODE 1S1555	

Ref.No	Part No	Description	Remark
D039	8-719-191-07	DIODE RD9.1E	
D041	8-719-168-07	DIODE RD6.8E-B	
D042	8-719-815-55	DIODE 1S1555	
D043	8-719-815-55	DIODE 1S1555	
IC			
IC031	8-759-157-40	IC UPC574J	
IC032	8-757-600-00	IC CX-760	
IC033	8-758-040-00	IC CX-804	
IC034=>	8-757-611-00	IC CX-761A	
COIL			
L031	1-408-247-00	MICRO INDUCTOR 33MMH	
L032	1-409-193-00	COIL 3.58MHZ TRAP	
L033	1-407-705-11	MICRO INDUCTOR 100UH	
L035	1-407-705-11	MICRO INDUCTOR 100UH	
L036	1-407-701-11	MICRO INDUCTOR 47UH	
CONNECTOR			
MB3	▲:1-560-127-00	PLUG, CONNECTOR (2.5MM) 7P	
MB11	▲:1-508-784-00	1P PLUG	
TRANSISTOR			
Q031	8-729-663-47	TRANSISTOR 2SC1364	
Q032	8-729-663-47	TRANSISTOR 2SC1364	
Q033	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q034	8-729-663-47	TRANSISTOR 2SC1364	
Q035	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q036	8-729-139-04	TRANSISTOR 2N3904	
Q038	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q039	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q040	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q041	8-729-663-47	TRANSISTOR 2SC1364	
Q042	8-729-663-47	TRANSISTOR 2SC1364	
Q043	8-729-663-47	TRANSISTOR 2SC1364	
Q044	8-729-663-47	TRANSISTOR 2SC1364	
Q045	=>8-729-612-77	TRANSISTOR 2SA1027R	
Q046	8-729-663-47	TRANSISTOR 2SC1364	
RESISTOR			
R031	1-246-504-00	CARBON 20K 5% 1/4W	
R032	1-246-487-00	CARBON 3.9K 5% 1/4W	
R033	1-246-473-00	CARBON 1K 5% 1/4W	
R034	1-246-479-00	CARBON 1.8K 5% 1/4W	
R035	1-246-459-00	CARBON 270 5% 1/4W	
R036	1-246-497-00	CARBON 10K 5% 1/4W	
R037	1-246-497-00	CARBON 10K 5% 1/4W	
R038	1-246-497-00	CARBON 10K 5% 1/4W	
R039	1-246-481-00	CARBON 2.2K 5% 1/4W	
R040	1-246-473-00	CARBON 1K 5% 1/4W	
R041	1-246-497-00	CARBON 10K 5% 1/4W	
R042	1-246-485-00	CARBON 3.3K 5% 1/4W	
R043	1-246-497-00	CARBON 10K 5% 1/4W	
R044	1-246-521-00	CARBON 100K 5% 1/4W	

Ref.No	Part No	Description	Remark
R045	1-246-533-00	CARBON 330K 5% 1/4W	
R046	1-246-509-00	CARBON 33K 5% 1/4W	
R047	1-246-497-00	CARBON 10K 5% 1/4W	
R048	1-246-505-00	CARBON 22K 5% 1/4W	
R049	1-246-497-00	CARBON 10K 5% 1/4W	
R050	1-246-497-00	CARBON 10K 5% 1/4W	
R051	1-206-696-00	METAL 22K 5% 2W	F
R053	1-246-509-00	CARBON 33K 5% 1/4W	
R057	1-246-535-00	CARBON 390K 5% 1/4W	
R058	1-246-507-00	CARBON 27K 5% 1/4W	
R059	1-246-449-00	CARBON 100 5% 1/4W	
R060	1-246-489-00	CARBON 4.7K 5% 1/4W	
R061	1-246-489-00	CARBON 4.7K 5% 1/4W	
R062	1-246-505-00	CARBON 22K 5% 1/4W	
R063	1-246-489-00	CARBON 4.7K 5% 1/4W	
R064	1-246-521-00	CARBON 100K 5% 1/4W	
R065	1-246-521-00	CARBON 100K 5% 1/4W	
R066	1-246-505-00	CARBON 22K 5% 1/4W	
R067	1-246-481-00	CARBON 2.2K 5% 1/4W	
R068	1-246-473-00	CARBON 1K 5% 1/4W	
R069	1-246-481-00	CARBON 2.2K 5% 1/4W	
R070	1-246-497-00	CARBON 10K 5% 1/4W	
R071	1-246-505-00	CARBON 22K 5% 1/4W	
R072	1-246-497-00	CARBON 10K 5% 1/4W	
R073	1-244-873-00	CARBON 1K 5% 1/2W	
R074	1-244-929-00	CARBON 220K 5% 1/2W	
R075	1-246-497-00	CARBON 10K 5% 1/4W	
R076	1-246-473-00	CARBON 1K 5% 1/4W	
R077	1-246-497-00	CARBON 10K 5% 1/4W	
R078	1-246-497-00	CARBON 10K 5% 1/4W	
R079	1-246-497-00	CARBON 10K 5% 1/4W	
R080	1-246-497-00	CARBON 10K 5% 1/4W	
R081	1-246-497-00	CARBON 10K 5% 1/4W	
R082	1-246-473-00	CARBON 1K 5% 1/4W	
R083	1-246-519-00	CARBON 82K 5% 1/4W	
R084	1-246-497-00	CARBON 10K 5% 1/4W	
R085	1-206-700-00	METAL 33K 5% 2W	F
R086	1-244-909-00	CARBON 33K 5% 1/2W	
R087	1-246-529-00	CARBON 220K 5% 1/4W	
R088	1-246-473-00	CARBON 1K 5% 1/4W	
R089	1-246-473-00	CARBON 1K 5% 1/4W	
R090	1-246-441-00	CARBON 47 5% 1/4W	
R091	1-246-513-00	CARBON 47K 5% 1/4W	
R092	1-246-499-00	CARBON 12K 5% 1/4W	
R093	1-246-515-00	CARBON 56K 5% 1/4W	
R094	1-246-507-00	CARBON 27K 5% 1/4W	
R095	1-246-519-00	CARBON 82K 5% 1/4W	
R096	1-246-497-00	CARBON 10K 5% 1/4W	
R097	1-246-513-00	CARBON 47K 5% 1/4W	
R098	1-246-473-00	CARBON 1K 5% 1/4W	
R099	1-202-667-00	COMPISITION 8.2M 5% 1/2W	
R141	1-246-501-00	CARBON 15K 5% 1/4W	
R142	1-246-521-00	CARBON 100K 5% 1/4W	

NOTE:

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

• =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

• Items marked " ▲ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS

• MF :  $\mu$ F, PF :  $\mu$  $\mu$ F

RESISTORS

• All resistors are in ohms.

• F : nonflammable.

COILS

• MMH : mH, UH :  $\mu$ H

NOTE:

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• MF :  $\mu$ F, PF :  $\mu$  $\mu$ F

RESISTORS

• All resistors are in ohms.

• F : nonflammable.

COILS

• MMH : mH, UH :  $\mu$ H

MB

G

G

Ref.No	Part No	Description	Remark			
R143	1-246-473-00	CARBON	1K	5%	1/4W	
R144	1-246-505-00	CARBON	22K	5%	1/4W	
POST PIN						
TP53	♣:1-536-354-00	POST PIN				
*****						
♣:A-1311-052-A	G BOARD, COMPLETE					E-106
♣:A-1-453-088-00	DC BLOCK, HIGH-VOLTAGE					E-105
1-533-146-00	HOLDER, FUSE					
♣:1-555-024-00	CONNECTOR ASSY, MINIATURE 3P					
♣:1-555-024-00	CONNECTOR ASSY, MINIATURE 3P					
♣:1-555-192-00	CONNECTOR ASSY (LARGE) 4P					
CAPACITOR						
C501	1-123-352-00	ELECT	1MF	20%	50V	
C502	1-123-352-00	ELECT	1MF	20%	50V	
C503	1-108-625-00	MYLAR	0.0082MF	10%	100V	
C504	1-108-638-00	MYLAR	0.1MF	10%	100V	
C505	1-108-633-11	MYLAR	0.039MF	10%	100V	
C506	1-130-203-00	FILM	0.01MF	5%	50V	
C507	1-108-622-11	MYLAR	0.0047MF	10%	100V	
C508	1-123-351-00	ELECT	0.47MF	20%	50V	
C509	1-123-316-00	ELECT	10MF	20%	16V	
C510	1-123-321-00	ELECT	220MF	20%	16V	
C511	1-102-973-00	CERAMIC	100PF	5%	50V	
C512	1-123-351-00	ELECT	0.47MF	20%	50V	
C513	1-123-354-00	ELECT	3.3MF	20%	50V	
C514	1-102-157-00	CERAMIC	560PF	10%	500V	
C515	1-121-999-00	ELECT	10MF		160V	
C516	1-102-973-00	CERAMIC	100PF	5%	50V	
C517	1-102-157-00	CERAMIC	560PF	10%	500V	
C518	1-123-351-00	ELECT	0.47MF	20%	50V	
C519	1-108-622-11	MYLAR	0.0047MF	10%	100V	
C520	1-123-358-00	ELECT	33MF	20%	50V	
C521	1-131-361-00	TANTALUM	2.2MF	20%	20V	
C522	1-131-197-00	TANTALUM	3.3MF	10%	16V	
C523	1-108-632-11	MYLAR	0.033MF	10%	100V	
C524	1-108-631-11	MYLAR	0.027MF	10%	100V	
C525	1-123-320-00	ELECT	100MF	20%	16V	
C526	1-108-616-11	MYLAR	0.0015MF	10%	100V	
C530	1-108-618-11	MYLAR	0.0022MF	10%	100V	
C531	1-123-316-00	ELECT	10MF	20%	16V	
C532	1-123-116-00	ELECT	1MF		160V	
C533	1-108-697-11	MYLAR	0.027MF	10%	200V	
C534	1-123-336-00	ELECT	470MF	20%	25V	
C535	1-123-336-00	ELECT	470MF	20%	25V	
C536	1-121-757-00	ELECT	33MF		160V	
C537	1-123-354-00	ELECT	3.3MF	20%	50V	
C538	1-123-024-51	ELECT	33MF		160V	
C539	1-121-999-00	ELECT	10MF		160V	
C540	1-123-022-00	ELECT	22MF		350V	

Ref.No	Part No	Description	Remark		
C541	1-129-918-00	FILM	0.0018MF	5%	1.5KV
C542	1-102-441-00	CERAMIC	470PF	20%	2KV
C550	1-123-353-00	ELECT	2.2MF	20%	50V
C801	1-108-688-11	MYLAR	0.0047MF	10%	200V
C802	1-123-331-00	ELECT	33MF	20%	25V
C803	1-123-334-00	ELECT	220MF	20%	25V
C804	1-123-321-00	ELECT	220MF	20%	16V
C805	1-125-195-00	ELECT	4.7MF		100V
C806	♣:1-108-546-00	MYLAR	1.5MF	10%	400V
C807	♣:1-129-936-00	FILM	0.0075MF	5%	1.5KV
C808	1-108-546-00	MYLAR	1.5MF	10%	400V
C809	1-108-646-00	MYLAR	0.47MF	10%	100V
C810	1-108-907-00	MYLAR	2.2MF	10%	200V
C811	1-123-252-00	ELECT	1MF		160V
C812	1-108-688-11	MYLAR	0.0047MF	10%	200V
C813	1-123-252-00	ELECT	1MF		160V
C814	1-123-024-51	ELECT	33MF		160V
DIODE					
D501	8-719-815-55	DIODE 1S1555			
D502	8-719-156-23	DIODE RD5.6EZ7S			
D503	=>8-719-930-12	DIODE EQB01-12Z			
D505	=>8-719-930-12	DIODE EQB01-12Z			
D506	=>8-719-320-11	DIODE HF-1A			
D507	=>8-719-200-02	DIODE 10E2			
D508	8-719-303-41	DIODE S-34			
D509	8-719-303-41	DIODE S-34			
D510	8-719-303-41	DIODE S-34			
D511	8-719-900-95	DIODE V09G			
D512	=>8-719-200-02	DIODE 10E2			
D513	=>8-719-305-15	DIODE GH3F			
D514	=>8-719-305-15	DIODE GH3F			
D515	8-719-320-11	DIODE HF-1A			
D801	8-719-936-09	DIODE EQB01-09			
D802	=>8-719-200-02	DIODE 10E2			
D803	=>8-719-200-02	DIODE 10E2			
D804	8-719-815-55	DIODE 1S1555			
D805	8-719-815-55	DIODE 1S1555			
D806	=>8-719-305-15	DIODE GH3F			
D807	=>8-719-931-10	DIODE EQB01-10			
D808	=>8-719-200-02	DIODE 10E2			
D809	=>8-719-200-02	DIODE 10E2			
D810	=>8-719-200-02	DIODE 10E2			
FUSE					
F501	♣:1-532-555-00	FUSE, GLASS TUBE			
F801	♣:1-532-555-00	FUSE, GLASS TUBE			
CONNECTOR					
G1	♣:1-506-349-21	3P PLUG (L)			
G2	♣:1-508-766-00	4P PLUG (M)			
G3	♣:1-508-766-00	4P PLUG (M)			
G4	♣:1-560-123-00	PLUG, CONNECTOR (2.5MM) 3P			

Ref.No	Part No	Description	Remark			
G5	♣:1-506-347-21	4P PLUG				
G6	♣:1-506-348-21	6P PLUG				
G7	♣:1-506-355-21	PLUG, 5P				
G8	♣:1-508-786-00	2P PLUG (M)				
G9	♣:1-508-784-00	1P PLUG				
G10	♣:1-508-765-00	3P PLUG (M)				
G11	♣:1-508-765-00	3P PLUG (M)				
G12	♣:1-508-765-00	3P PLUG (M)				
G13	♣:1-508-784-00	1P PLUG				
G14	♣:1-506-349-21	3P PLUG (L)				
G15	♣:1-506-349-21	3P PLUG (L)				
G16	♣:1-508-765-00	3P PLUG (M)				
G17	♣:1-506-349-21	3P PLUG (L)				
G18	♣:1-506-347-21	4P PLUG				
G19	♣:1-506-371-00	2P PLUG (L)				
G21	♣:1-506-349-21	3P PLUG (L)				
G22	♣:1-508-765-00	3P PLUG (M)				
<u>IC</u>						
IC501	8-759-105-57	IC CX-557				
<u>COIL</u>						
L501	1-407-687-11	MICRO INDUCTOR 3.3UH				
L502	1-407-709-00	MICRO INDUCTOR 220UH				
L505	1-459-104-00	COIL,DUST CORE				
L506	1-407-705-11	MICRO INDUCTOR 100UH				
L507	1-407-705-11	MICRO INDUCTOR 100UH				
L801	1-407-720-00	CHOKE COIL				
L802	1-407-720-00	CHOKE COIL				
<u>NEON LAMP</u>						
NL801	1-519-108-XX	LAMP, NEON ASSY				
<u>TRANSISTOR</u>						
Q501	8-729-213-11	TRANSISTOR 2SC2230A				
Q502	8-729-213-11	TRANSISTOR 2SC2230A				
Q503	8-729-663-47	TRANSISTOR 2SC1364				
Q504	8-729-663-47	TRANSISTOR 2SC1364				
Q505	=>8-765-170-01	TRANSISTOR 2SC1962				
Q801	8-729-663-47	TRANSISTOR 2SC1364				
Q802	8-729-663-47	TRANSISTOR 2SC1364				
Q803	=>8-729-612-77	TRANSISTOR 2SA-1027R				
Q804	8-729-663-47	TRANSISTOR 2SC1364				
Q805	8-729-663-47	TRANSISTOR 2SC1364				
Q806	8-729-309-06	TRANSISTOR 2SC1890A				
Q807	8-729-213-11	TRANSISTOR 2SC2230A				
Q808	8-729-213-11	TRANSISTOR 2SC2230A				
<u>RESISTOR</u>						
R501	1-246-467-00	CARBON	560	5%	1/4W	
R502	1-246-541-00	CARBON	680K	5%	1/4W	
R503	1-246-459-00	CARBON	270	5%	1/4W	

Ref.No	Part No	Description	Remark			
R504	1-246-523-00	CARBON	120K	5%	1/4W	
R505	1-246-511-00	CARBON	39K	5%	1/4W	
R506	1-246-483-00	CARBON	2.7K	5%	1/4W	
R507	1-246-501-00	CARBON	15K	5%	1/4W	
R508	1-246-481-00	CARBON	2.2K	5%	1/4W	
R509	1-246-489-00	CARBON	4.7K	5%	1/4W	
R510	1-246-481-00	CARBON	2.2K	5%	1/4W	
R511	1-246-449-00	CARBON	100	5%	1/4W	
R512	1-246-465-00	CARBON	470	5%	1/4W	
R513	1-247-014-11	CARBON	1.8K	5%	1/4W	F
R514	1-247-014-11	CARBON	1.8K	5%	1/4W	F
R515	1-246-465-00	CARBON	470	5%	1/4W	
R516	1-246-449-00	CARBON	100	5%	1/4W	
R517	1-246-493-00	CARBON	6.8K	5%	1/4W	
R518	1-246-465-00	CARBON	470	5%	1/4W	
R519	1-246-491-00	CARBON	5.6K	5%	1/4W	
R520	1-246-453-00	CARBON	150	5%	1/4W	
R521	1-246-489-00	CARBON	4.7K	5%	1/4W	
R522	1-246-457-00	CARBON	220	5%	1/4W	
R523	1-214-110-00	METAL	120	1%	1/4W	
R524	1-214-116-00	METAL	220	1%	1/4W	
R525	1-214-162-00	METAL	18K	1%	1/4W	
R526	1-246-449-00	CARBON	100	5%	1/4W	
R527	1-246-493-00	CARBON	6.8K	5%	1/4W	
R528	1-206-732-00	METAL	2K	5%	3W	F
R529	1-206-732-00	METAL	2K	5%	3W	F
R530	1-206-732-00	METAL	2K	5%	3W	F
R531	1-211-626-00	CARBON	330	5%	1/2W	F
R532	1-206-731-00	METAL	1.8K	5%	3W	F
R533	1-206-731-00	METAL	1.8K	5%	3W	F
R534	1-211-626-00	CARBON	330	5%	1/2W	F
R535	1-246-509-00	CARBON	33K	5%	1/4W	
R536	1-246-441-00	CARBON	47	5%	1/4W	
R537	1-246-513-00	CARBON	47K	5%	1/4W	
R538	1-206-439-00	METAL	1	5%	2W	F
R539	1-206-439-00	METAL	1	5%	2W	F
R540	1-206-529-00	METAL	56	5%	3W	F
R541	1-212-368-00	METAL	4.7	5%	1W	F
R542	1-246-457-00	CARBON	220	5%	1/4W	
R543	1-247-034-00	CARBON	220	5%	1/8W	F
R544	1-206-680-00	METAL	4.7K	5%	2W	F
R545	1-206-439-00	METAL	1	5%	2W	F
R546	1-206-439-00	METAL	1	5%	2W	F
R547	1-206-439-00	METAL	1	5%	2W	F
R548	1-206-692-00	METAL	15K	5%	2W	F
R549	1-206-457-00	METAL	5.6	5%	2W	F
R550	1-213-146-00	METAL	1.8K	5%	1W	F
R801	1-247-040-00	CARBON	1K	5%	1/3W	F
R802	1-214-180-00	METAL	100K	1%	1/4W	
R803		CARBON			1/4W	
R804		CARBON			1/4W	
R805	1-246-497-00	CARBON	10K	5%	1/4W	
R806	1-206-700-00	METAL	33K	5%	2W	F



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Ref.No	Part No	Description	Remark			
R807	1-246-513-00	CARBON	47K	5%	1/4W	
R808	1-246-513-00	CARBON	47K	5%	1/4W	
R809	1-246-493-00	CARBON	6.8K	5%	1/4W	
R810	1-246-497-00	CARBON	10K	5%	1/4W	
R811	1-246-497-00	CARBON	10K	5%	1/4W	
R812	1-246-497-00	CARBON	10K	5%	1/4W	
R813	1-247-040-00	CARBON	1K	5%	1/8W	F
R814	1-214-180-00	METAL	100K	1%	1/4W	
■R815 ▲		CARBON			1/4W	
■R816 ▲		CARBON			1/4W	
R817	1-244-933-00	CARBON	330K	5%	1/2W	
R818	1-211-651-00	CARBON	3.6K	5%	1/2W	F
R819	1-246-989-11	CARBON	82	5%	1/8W	F
R820	1-246-994-00	CARBON	680	5%	1/8W	F
.821	1-206-745-00	METAL	6.8K	5%	3W	F
R822	1-244-899-00	CARBON	12K	5%	1/2W	
R823	1-212-698-00	METAL	68K	1%	1/2W	
R825	1-214-166-00	METAL	27K	1%	1/4W	
R826	1-214-174-00	METAL	56K	1%	1/4W	
R827	1-246-473-00	CARBON	1K	5%	1/4W	
<u>VARIABLE RESISTOR</u>						
RV501	1-226-819-00	RES, ADJ, METAL GLAZE 1K				
<u>RESISTOR</u>						
T501	1-437-078-00	TRANSFORMER, HORIZONTAL DRIVE				
T502	1-437-078-00	TRANSFORMER, HORIZONTAL DRIVE				
T503	1-439-264-00	LOT (FERRITE TRANSFORMER)				
T801 ▲	1-421-409-00	COIL, FERRITE				
*****						
▲:A-1330-277-A	<u>C BOARD, COMPLETE</u>					E-55
▲:1-508-765-00	3P PLUG (M)					
▲:1-508-766-00	4P PLUG (M)					
▲:1-508-784-00	1P PLUG					
▲:1-508-786-00	2P PLUG (M)					
1-526-644-00	SOCKET, CRT					
▲:1-587-474-00	PC BOARD, C					
▲:4-324-413-00	HEAT SINK, B					
<u>CAPACITOR</u>						
C701	1-123-028-00	ELECT	2.2MF		350V	
C702	1-121-963-00	ELECT	33MF	20%	25V	
C703	1-102-267-00	CERAMIC	0.0068MF		500V	
C704	1-102-155-00	CERAMIC	330PF	20%	2KV	
C706	1-102-155-00	CERAMIC	330PF	20%	2KV	
<u>COIL</u>						
L701	1-407-492-00	MICRO INDUCTOR 1MMH				
L702	1-407-364-00	COIL, SPOOK CHOKE				
L703	1-407-364-00	COIL, SPOOK CHOKE				

NOTE:

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

• =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

• Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH

DA

Ref.No	Part No	Description	Remark			
C5527	1-123-321-00	ELECT	220MF	20%	16V	
C5528	1-108-618-11	MYLAR	0.0022MF	10%	100V	
C5529	1-123-320-00	ELECT	100MF	20%	16V	
C5530	1-123-320-00	ELECT	100MF	20%	16V	
C5531	1-108-634-11	MYLAR	0.047MF	10%	100V	
C5532	1-108-616-11	MYLAR	0.0015MF	10%	100V	
C5533	1-123-316-00	ELECT	10MF	20%	16V	
C5534	1-123-316-00	ELECT	10MF	20%	16V	
C5535	1-123-331-00	ELECT	33MF	20%	25V	
C5536	1-123-316-00	ELECT	10MF	20%	16V	
C5537	1-123-329-00	ELECT	10MF	20%	25V	
C5538	1-123-330-00	ELECT	22MF	20%	25V	
C5539	1-123-316-00	ELECT	10MF	20%	16V	
C5540	1-102-228-00	CERAMIC	470PF	10%	500V	
C5541	1-123-116-00	ELECT	1MF		160V	
C5542	1-108-632-11	MYLAR	0.033MF	10%	100V	
C5543	1-123-318-00	ELECT	33MF	20%	16V	
C5544	1-123-318-00	ELECT	33MF	20%	16V	
C5545	1-108-634-11	MYLAR	0.047MF	10%	100V	
C5546	1-108-614-11	MYLAR	0.001MF	10%	100V	
C5547	1-123-318-00	ELECT	33MF	20%	16V	
C5549	1-123-316-00	ELECT	10MF	20%	16V	
C5550	1-123-329-00	ELECT	10MF	20%	25V	
C5551	1-123-316-00	ELECT	10MF	20%	16V	
C5552	1-123-330-00	ELECT	22MF	20%	25V	
C5553	1-123-316-00	ELECT	10MF	20%	16V	
C5554	1-123-316-00	ELECT	10MF	20%	16V	
C5555	1-108-636-11	MYLAR	0.068MF	10%	100V	
C5556	1-123-318-00	ELECT	33MF	20%	16V	
C5557	1-123-316-00	ELECT	10MF	20%	16V	
C5558	1-123-316-00	ELECT	10MF	20%	16V	
DIODE						
D5501=>8-719-931-05	DIODE EQB01-05					
D5502=>8-719-931-05	DIODE EQB01-05					
D5503=>8-719-930-12	DIODE EQB01-12Z					
CONNECTOR						
DA1	♣:1-508-767-00	5P PLUG				
DA2	♣:1-508-766-00	4P PLUG (M)				
DA3	♣:1-508-768-00	6P PLUG				
DA4	♣:1-508-768-00	6P PLUG				
DA5	♣:1-508-768-00	6P PLUG				
DA6	♣:1-508-786-00	2P PLUG (M)				
DA7	♣:1-506-355-21	PLUG, 5P				
DA8	♣:1-508-784-00	1P PLUG				
DA9	♣:1-508-765-00	3P PLUG (M)				
DA10	♣:1-508-766-00	4P PLUG (M)				
DA11	♣:1-508-766-00	4P PLUG (M)				
/						
COIL						
L5501	1-407-705-11	MICRO INDUCTOR 100UH				

NOTE:

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

• =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

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• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH





DB

Ref.No	Part No	Description	Remark		
♣:A-1340-343-A	DB BOARD, COMPLETE		E-102		
4-347-706-01	HEAT SINK (TR)				
♣:4-821-501-00	HEAT SINK				
CAPACITOR					
C5301	1-108-626-11	MYLAR	0.01MF	10%	100V
C5302	1-108-680-11	MYLAR	0.001MF	10%	200V
C5303	1-108-680-11	MYLAR	0.001MF	10%	200V
C5304	1-108-700-11	MYLAR	0.047MF	10%	200V
C5305	1-108-630-11	MYLAR	0.022MF	10%	100V
C5306	1-102-820-00	CERAMIC	330PF	5%	50V
C5308	1-123-328-00	ELECT	4.7MF	20%	25V
C5309	1-121-246-00	ELECT	4.7MF		160V
C5310	1-108-618-11	MYLAR	0.0022MF	10%	100V
C5311	1-108-630-11	MYLAR	0.022MF	10%	100V
C5312	1-102-947-00	CERAMIC	10PF	5%	50V
C5313	1-108-630-11	MYLAR	0.022MF	10%	100V
C5314	1-108-688-11	MYLAR	0.0047MF	10%	200V
C5315	1-123-116-00	ELECT	1MF		160V
C5316	1-123-323-00	ELECT	470MF	20%	16V
C5317	1-130-121-00	FILM	0.0045MF	3%	1.5KV
C5318	1-130-157-00	FILM	1MF	5%	200V
C5319	1-102-978-00	CERAMIC	220PF	5%	50V
C5320	1-108-626-11	MYLAR	0.01MF	10%	100V
C5321	1-108-680-11	MYLAR	0.001MF	10%	200V
C5322	1-108-680-11	MYLAR	0.001MF	10%	200V
C5323	1-108-700-11	MYLAR	0.047MF	10%	200V
C5324	1-108-630-11	MYLAR	0.022MF	10%	100V
C5325	1-102-820-00	CERAMIC	330PF	5%	50V
C5327	1-123-328-00	ELECT	4.7MF	20%	25V
C5328	1-121-246-00	ELECT	4.7MF		160V
C5329	1-108-618-11	MYLAR	0.0022MF	10%	100V
C5330	1-108-630-11	MYLAR	0.022MF	10%	100V
C5331	1-102-947-00	CERAMIC	10PF	5%	50V
C5332	1-108-630-11	MYLAR	0.022MF	10%	100V
C5333	1-108-688-11	MYLAR	0.0047MF	10%	200V
C5334	1-123-116-00	ELECT	1MF		160V
C5335	1-130-121-00	FILM	0.0045MF	3%	1.5KV
C5336	1-123-323-00	ELECT	470MF	20%	16V
C5337	1-130-157-00	FILM	1MF	5%	200V
C5338	1-108-702-11	MYLAR	0.068MF	10%	200V
C5339	1-102-978-00	CERAMIC	220PF	5%	50V
C5340	1-108-626-11	MYLAR	0.01MF	10%	100V
C5341	1-108-680-11	MYLAR	0.001MF	10%	200V
C5342	1-108-680-11	MYLAR	0.001MF	10%	200V
C5343	1-108-700-11	MYLAR	0.047MF	10%	200V
C5344	1-108-630-11	MYLAR	0.022MF	10%	100V
C5345	1-102-820-00	CERAMIC	330PF	5%	50V
C5347	1-123-328-00	ELECT	4.7MF	20%	25V
C5348	1-121-246-00	ELECT	4.7MF		160V
C5349	1-108-618-11	MYLAR	0.0022MF	10%	100V
C5350	1-108-630-11	MYLAR	0.022MF	10%	100V

NOTE:

The components identified by shading and mark ♣ are critical for safety. Replace only with part number specified.

=>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

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• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH

DB

Ref.No	Part No	Description	Remark
TRANSISTOR			
Q5301	8-765-020-00	TRANSISTOR	2SA884
Q5302=>8-729-612-77		TRANSISTOR	2SA1027R
Q5303=>8-729-612-77		TRANSISTOR	2SA1027R
Q5304=>8-765-170-01		TRANSISTOR	2SC1962
Q5305	8-729-307-82	TRANSISTOR	2SD478
Q5306	8-729-326-82	TRANSISTOR	2SB568
Q5307=>8-729-612-77		TRANSISTOR	2SA1027R
Q5308=>8-729-612-77		TRANSISTOR	2SA1027R
Q5309	8-729-309-06	TRANSISTOR	2SC1890A
Q5310	8-729-307-82	TRANSISTOR	2SD478
Q5311	8-729-326-82	TRANSISTOR	2SB568
Q5312	8-765-222-20	TRANSISTOR	2SC1963
Q5313=>8-729-612-77		TRANSISTOR	2SA1027R
Q5314=>8-729-612-77		TRANSISTOR	2SA1027R
Q5315	8-729-663-47	TRANSISTOR	2SC1364
Q5316	8-729-316-12	TRANSISTOR	2SC1061
Q5317	8-729-317-12	TRANSISTOR	2SA671
Q5318	8-729-307-82	TRANSISTOR	2SD478
Q5319	8-729-309-06	TRANSISTOR	2SC1890A
Q5320	8-765-020-00	TRANSISTOR	2SA884
Q5321=>8-729-612-77		TRANSISTOR	2SA1027R
Q5322=>8-729-612-77		TRANSISTOR	2SA1027R
Q5323=>8-765-170-01		TRANSISTOR	2SC1962
Q5324	8-729-307-82	TRANSISTOR	2SD478
Q5325	8-729-336-82	TRANSISTOR	2SB568
Q5326=>8-729-612-77		TRANSISTOR	2SA1027R
Q5327=>8-729-612-77		TRANSISTOR	2SA1027R
Q5328	8-729-309-06	TRANSISTOR	2SC1890A
Q5329	8-729-307-82	TRANSISTOR	2SD478
Q5330	8-729-326-82	TRANSISTOR	2SB568
Q5331	8-765-222-20	TRANSISTOR	2SC1963
Q5332=>8-729-612-77		TRANSISTOR	2SA1027R
Q5333=>8-729-612-77		TRANSISTOR	2SA1027R
Q5334	8-729-316-12	TRANSISTOR	2SC1061
Q5335	8-729-317-12	TRANSISTOR	2SA671
Q5336	8-729-663-47	TRANSISTOR	2SC1364
Q5337	8-729-307-82	TRANSISTOR	2SD478
Q5338	8-729-309-06	TRANSISTOR	2SC1890A
Q5340	8-765-020-00	TRANSISTOR	2SA884
Q5341=>8-729-612-77		TRANSISTOR	2SA1027R
Q5342=>8-729-612-77		TRANSISTOR	2SA1027R
Q5343=>8-765-170-01		TRANSISTOR	2SC1962
Q5344	8-729-307-82	TRANSISTOR	2SD478
Q5345	8-729-326-82	TRANSISTOR	2SB568
Q5346=>8-729-612-77		TRANSISTOR	2SA1027R
Q5347=>8-729-612-77		TRANSISTOR	2SA1027R
Q5348	8-729-309-06	TRANSISTOR	2SC1890A
Q5349	8-729-307-82	TRANSISTOR	2SD478
Q5350	8-729-326-82	TRANSISTOR	2SB568
Q5351	8-765-222-20	TRANSISTOR	2SC1963
Q5352=>8-729-612-77		TRANSISTOR	2SA1027R

NOTE:

The components identified by shading and mark ♣ are critical for safety. Replace only with part number specified.

=>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

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• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH

K	S	HB	HA
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Ref.No	Part No	Description				Remark
R5400	1-213-151-00	METAL	4.7K	5%	1W	F
R5401	1-214-144-00	METAL	3.3K	1%	1/4W	
R5402	1-246-517-00	CARBON	68K	5%	1/4W	
R5403	1-246-517-00	CARBON	68K	5%	1/4W	
R5404	1-246-517-00	CARBON	68K	5%	1/4W	
R5405	1-246-487-00	CARBON	3.9K	5%	1/4W	
R5406	1-246-469-00	CARBON	680	5%	1/4W	
R5407	1-246-469-00	CARBON	680	5%	1/4W	
R5408	1-213-143-00	METAL	1K	5%	1W	F
R5409	1-246-994-00	CARBON	680	5%	1/8W	F
R5410	1-214-092-00	METAL	22	1%	1/4W	
R5411	1-214-092-00	METAL	22	1%	1/4W	
R5412	1-214-092-00	METAL	22	1%	1/4W	
R5413	1-213-148-00	METAL	2.7K	5%	1W	F
R5414	1-247-040-00	CARBON	1K	5%	1/8W	F
R5415	1-206-751-00	METAL	12K	5%	3W	F
R5416	1-206-656-00	METAL	470	5%	2W	F
R5417	1-246-523-00	CARBON	120K	5%	1/4W	
R5418	1-246-425-00	CARBON	10	5%	1/4W	
R5419	1-246-425-00	CARBON	10	5%	1/4W	
R5420	1-214-156-00	METAL	10K	1%	1/4W	
R5421	1-246-527-00	CARBON	180K	5%	1/4W	
R5422	1-213-149-00	METAL	3.3	5%	1W	F
R5423	1-213-149-00	METAL	3.3	5%	1W	F
R5424	1-213-149-00	METAL	3.3	5%	1W	F
<u>TRANSFORMER</u>						
T5301	1-439-137-00	TRANSFORMER, HORIZONTAL OUTPUT				
T5302	1-439-137-00	TRANSFORMER, HORIZONTAL OUTPUT				
T5303	1-439-137-00	TRANSFORMER, HORIZONTAL OUTPUT				
*****						
1-603-228-00	<u>S BOARD</u>					E-111
<u>CAPACITOR</u>						
C101	1-123-329-00	ELECT	10MF	20%	25V	
C102	1-123-329-00	ELECT	10MF	20%	25V	
C103	1-123-329-00	ELECT	10MF	20%	25V	
C104	1-123-318-00	ELECT	33MF	20%	16V	
C105	1-123-318-00	ELECT	33MF	20%	16V	
C106	1-108-638-00	MYLAR	0.1MF	10%	100V	
C108	1-108-634-11	MYLAR	0.047MF	10%	100V	
C109	1-108-636-11	MYLAR	0.068MF	10%	100V	
<u>TRANSISTOR</u>						
Q101	8-729-663-47	TRANSISTOR 2SC1364				
<u>RESISTOR</u>						
R102	1-246-465-00	CARBON	470	5%	1/4W	
R103	1-246-509-00	CARBON	33K	5%	1/4W	
R104	1-246-533-00	CARBON	330K	5%	1/4W	
R105	1-246-481-00	CARBON	2.2K	5%	1/4W	

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- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

COILS  
• MMH : mH, UH :  $\mu$ H

K

Ref.No	Part No	Description	Remark
K6	▲:1-508-765-00	3P PLUG (M)	
K7	▲:1-508-765-00	3P PLUG (M)	
K13	▲:1-506-355-21	PLUG, 5P	
K14	▲:1-506-355-21	PLUG, 5P	
K15	▲:1-508-784-00	1P PLUG	
COIL			
L2001	1-407-713-11	MICRO INDUCTOR 470UH	
TRANSISTOR			
Q2001	8-729-663-47	TRANSISTOR 2SC1364	
Q2002	8-729-663-47	TRANSISTOR 2SC1364	
Q2003	8-729-663-47	TRANSISTOR 2SC1364	
Q2004	8-729-663-47	TRANSISTOR 2SC1364	
Q2005	8-729-663-47	TRANSISTOR 2SC1364	
Q2006	8-729-663-47	TRANSISTOR 2SC1364	
Q2007	8-729-663-47	TRANSISTOR 2SC1364	
Q2008	8-729-663-47	TRANSISTOR 2SC1364	
Q2009	8-729-663-47	TRANSISTOR 2SC1364	
Q2010	8-729-663-47	TRANSISTOR 2SC1364	
Q2011	8-729-663-47	TRANSISTOR 2SC1364	
Q2012	8-729-663-47	TRANSISTOR 2SC1364	
Q2019	8-729-307-82	TRANSISTOR 2SD478	
Q2020	8-729-170-01	TRANSISTOR 2SC1962	
Q2021	8-729-326-82	TRANSISTOR 2SB568	
Q2022	8-729-663-47	TRANSISTOR 2SC1364	
Q2023	8-729-309-06	TRANSISTOR 2SC1890A	
Q2024	8-729-663-47	TRANSISTOR 2SC1364	
RESISTOR			
R2001	1-246-505-00	CARBON 22K 5% 1/4W	
R2002	1-246-529-00	CARBON 220K 5% 1/4W	
R2003	1-246-519-00	CARBON 82K 5% 1/4W	
R2004	1-246-533-00	CARBON 330K 5% 1/4W	
R2005	1-246-493-00	CARBON 6.8K 5% 1/4W	
R2006	1-246-515-00	CARBON 56K 5% 1/4W	
R2007	1-246-531-00	CARBON 270K 5% 1/4W	
R2008	1-246-497-00	CARBON 10K 5% 1/4W	
R2009	1-246-485-00	CARBON 3.3K 5% 1/4W	
R2010	1-246-495-00	CARBON 8.2K 5% 1/4W	
R2011	1-246-521-00	CARBON 100K 5% 1/4W	
R2012	1-246-473-00	CARBON 1K 5% 1/4W	
R2013	1-246-469-00	CARBON 680 5% 1/4W	
R2014	1-246-469-00	CARBON 680 5% 1/4W	
R2015	1-246-479-00	CARBON 1.8K 5% 1/4W	
R2016	1-246-473-00	CARBON 1K 5% 1/4W	
R2017	1-246-455-00	CARBON 180 5% 1/4W	
R2018	1-246-481-00	CARBON 2.2K 5% 1/4W	
R2019	1-246-519-00	CARBON 82K 5% 1/4W	
R2020	1-246-513-00	CARBON 47K 5% 1/4W	
R2021	1-246-537-00	CARBON 470K 5% 1/4W	
R2022	1-246-473-00	CARBON 1K 5% 1/4W	
R2023	1-246-473-00	CARBON 1K 5% 1/4W	

NOTE:

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

• =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

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• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH

Ref.No	Part No	Description	Remark
R2024	1-246-479-00	CARBON 1.8K 5% 1/4W	
R2025	1-246-497-00	CARBON 10K 5% 1/4W	
R2026	1-246-513-00	CARBON 47K 5% 1/4W	
R2027	1-246-493-00	CARBON 6.8K 5% 1/4W	
R2028	1-246-509-00	CARBON 33K 5% 1/4W	
R2029	1-246-501-00	CARBON 15K 5% 1/4W	
R2030	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2031	1-246-521-00	CARBON 100K 5% 1/4W	
R2032	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2033	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2034	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2035	1-246-509-00	CARBON 33K 5% 1/4W	
R2036	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2037	1-246-529-00	CARBON 220K 5% 1/4W	
R2056	1-246-483-00	CARBON 2.7K 5% 1/4W	
R2057	1-246-487-00	CARBON 3.9K 5% 1/4W	
R2058	1-246-487-00	CARBON 3.9K 5% 1/4W	
R2059	1-246-523-00	CARBON 120K 5% 1/4W	
R2060	1-244-889-00	CARBON 4.7K 5% 1/2W	
R2061	1-246-461-00	CARBON 330 5% 1/4W	
R2062	1-213-156-00	METAL 12K 5% 1W F	
R2063	1-247-043-00	CARBON 15 5% 1/2W F	
R2064	1-247-043-00	CARBON 15 5% 1/2W F	
R2065	1-247-043-00	CARBON 15 5% 1/2W F	
R2066	1-246-521-00	CARBON 100K 5% 1/4W	
R2067	1-246-489-00	CARBON 4.7K 5% 1/4W	
R2068	1-246-509-00	CARBON 33K 5% 1/4W	
R2069	1-246-473-00	CARBON 1K 5% 1/4W	
R2070	1-246-521-00	CARBON 100K 5% 1/4W	
R2071	1-246-495-00	CARBON 8.2K 5% 1/4W	
R2072	1-247-037-00	CARBON 390 5% 1/8W F	
R2073	1-206-690-00	METAL 12K 5% 2W F	
R2074	1-246-463-00	CARBON 390 5% 1/4W	
R2075	1-246-509-00	CARBON 33K 5% 1/4W	
R2076	1-246-528-00	CARBON 200K 5% 1/4W	
R2077	1-246-515-00	CARBON 56K 5% 1/4W	
R2078	1-246-513-00	CARBON 47K 5% 1/4W	
VARIABLE RESISTOR			
RV2001	1-224-990-00	RES, ADJ, CARBON 47K	
RV2002	1-224-990-00	RES, ADJ, CARBON 47K	
SWITCH			
S2001	1-516-640-00	SWITCH,SLIDE	
TRANSFORMER			
T2001	▲:1-427-489-00	TRANSFORMER, SOUND OUTPUT	
T2002	▲:1-427-481-00	TRANSFOEMER, OUTPUT (AUDIO)	
***** MISCELLANEOUS *****			
▲:1-451-190-00	DEFLECTION YOKE (SY-116)	E-56	
▲:1-452-203-41	CRT NECK ASSEMBLY	E-54	

Ref.No	Part No	Description	Remark
▲:1-463-264-00	TUNER (BT-852)	E-112	
▲:1-509-576-00	CONNECTOR ASSY (2P)		
▲:1-509-828-12	CONNECTOR ASSY (LARGE) 5P		
▲:1-534-885-00	CABLE, P-P	E-109	
1-536-376-31	L-TYPE TERMINAL STRIP	E-110	
▲:1-536-584-00	TERMINAL BOARD ASSY, ANTENNA	E-113	
▲:1-551-613-00	CONNECTOR ASSY, MINIATURE 2P		
▲:1-551-614-00	CONNECTOR ASSY, MINIATURE 2P		
▲:1-551-792-00	CONNECTOR ASSY (L) 2P		
▲:1-551-845-00	CONNECTOR ASSY (2.5MM) 10P		
▲:1-551-910-00	CONNECTOR ASSY, MINIATURE 6P		
▲:1-551-933-00	CONNECTOR ASSY (2.5MM) 3P		
▲:1-551-934-00	CONNECTOR ASSY (2.5MM) 3P		
▲:1-555-023-00	CONNECTOR ASSY, MINIATURE 3P		
▲:1-555-024-00	CONNECTOR ASSY, MINIATURE 3P		
▲:1-555-182-00	CONNECTOR ASSY, MINIATURE 4P		
▲:1-555-183-00	CONNECTOR ASSY, MINIATURE 4P		
▲:1-555-188-00	CONNECTOR, MINIATURE 2P		
▲:1-555-192-00	CONNECTOR ASSY (LARGE) 4P		
▲:1-555-225-00	CONNECTOR ASSY 1P		
▲:1-555-342-00	CONNECTOR ASSY (2.5MM) 3P		
▲:1-555-346-00	CONNECTOR ASSY, MINIATURE 1P		
▲:1-555-347-00	CONNECTOR ASSY, MINIATURE 1P		
▲:1-555-348-00	CONNECTOR, MINIATURE 1P		
▲:1-555-349-00	CONNECTOR, MINIATURE 1P		
▲:1-555-390-00	CONNECTOR ASSY, MINIATURE 5P		
▲:1-555-433-00	CONNECTOR ASSY (LARGE) 6P		
▲:1-555-436-00	CONNECTOR ASSY (LARGE) 3P		
▲:1-555-465-00	CORD, POWER	E-2	
▲:1-561-014-00	CONNECTOR ASSY, MINIATURE, 1P		
▲:1-561-347-00	OUTLET, AC	E-115	
▲:8-738-101-05	PICTURE TUBE SD-116 G	E-53	
▲:8-738-102-05	PICTURE TUBE SD-116 B	E-52	
▲:8-738-103-05	PICTURE TUBE SD-116 R	E-57	
C901	1-102-155-00	CAP, CERAMIC 330PF 2KV	
C902	1-102-155-00	CAP, CERAMIC 330PF 2KV	
J901	1-507-370-11	PIN JACK, 2P	E-114
J902	1-507-370-11	PIN JACK, 2P	E-114
L901	1-407-365-00	COIL, CHOKE (HIGH FREQUENCY)	
L902	1-407-365-00	COIL, CHOKE (HIGH FREQUENCY)	
L903	1-407-365-00	COIL, CHOKE (HIGH FREQUENCY)	
L904	1-407-365-00	COIL, CHOKE (HIGH FREQUENCY)	
Q901	8-729-311-42	TRANSISTOR 2SC1114	E-101
Q902	8-729-341-34	TRANSISTOR 2SC1413A	E-107
Q904	8-729-301-62	TRANSISTOR 2SC1116A	E-108
RV901	1-226-064-00	RES, VAR, SLIDE 50K-A	E-152
R901	1-205-497-00	RES, SEMENT 120 40W F	E-103
R910	1-246-509-00	RES, CARBON 33K 1/4W	
SP901	1-502-869-00	SPEAKER	E-1
SP902	1-502-869-00	SPEAKER	E-1
SP901	▲:1-552-658-00	SWITCH, PUSH	E-151

NOTE:

The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

• =>: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

• Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

CAPACITORS  
• MF : μF, PF : μμF

RESISTORS  
• All resistors are in ohms.  
• F : nonflammable.

COILS  
• MMH : mH, UH : μH

MEMO

STANDARD PARTS LIST

\*\*\*\* CAPACITOR ELECT \*\*\*\*

uF	6.3V	10V	16V	25V	35V	50V	100V	160V	250V	350V
	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
0.47						1-121-726				
1.0						391	1-123-249	1-123-252	1-123-003	1-121-168
2.2						450	250	026		1-123-028
3.3				1-121-392		393	1-121-995		004	006
4.7				395		396	1-123-255	1-121-246	1-121-759	007
10			1-121-651	398		738	1-121-126	999	1-123-254	008
22			479	480	1-121-662	152	996	1-123-253		022
33			403	404	652	405	997	919		
47		1-121-352	409	410	653	411	1-123-251			
100		414	415	416	357	417	084			
220	1-121-419	420	421	422	261	423				
330	751	805	521	654	655	656				
470	424	425	426	733	361	810				
1000		736	245	657		1-123-061				
2200	658	659	660	1-123-067	984					
3300	661	1-121-075	1-123-071							

\*\*\*\* CAPACITOR \*\*\*\*

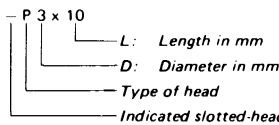
MYLAR				CERAMIC											
uF	50V	100V	200V	pF	Part No.		pF	Part No.		pF	Part No.		pF	Part No.	
	10%	10%	10%												
0.001	1-108-227	1-108-365	1-108-403	0.5	1-101-837		100	1-102-973		1000	1-101-001				
0.0012	351	365	410	0.75	586		110	815		2200	002				
0.0015	228	367	411	1.0	1-102-934		120	816	F	4700	003				
0.0018	352	368	412	1.5	1-101-576		130	1-101-081		10000	004				
0.0022	230	369	413	2.0	1-102-935		150	361		22000	005				
0.0027	353	370	414	S 3	936	S	160	367		47000	006				
0.0033	232	371	415	L 4	937		180	1-102-976							
0.0039	354	372	416	5	942	L	200	977							
0.0047	234	373	417	6	943		220	978							
0.0056	355	374	418	7	944		240	979							
0.0063	237	375	419	8	945		270	980							
0.0082	356	376	420	9	946		300	981							
0.01	239	377	421	10	947		330	820							
0.012	357	378	422	11	948		360	821							
0.015	240	379	423	12	949		390	822							
0.018	358	380	424	13	950		430	823							
0.022	242	381	425	15	951		470	824							
0.027	359	382	426	16	952		510	1-101-059							
0.033	244	383	427	18	953										
0.039	360	384	428	20	958		560	1-102-115							
0.047	246	385	429	22	959		630	116							
0.056	361	386	430	24	960		820	117							
0.068	249	387	431	27	961		1000	074							
0.082	362	388	432	30	962		1200	118							
0.1	251	389	433	33	963		1500	119							
0.12	363	390	434	36	964	B	1800	120							
0.15	252	391	435	39	965		2200	121							
0.18	364	392	436	43	966		2700	122							
0.22	254	393	437	47	1-101-880		3300	123							
0.27	854			51	882		3900	124							
0.33	855			56	884		4700	125							
0.39	856			62	886		5600	126							
0.47	857			68	888		6800	127							
				75	890		8200	128							
				82	1-102-971		10000	129							
				91	972										

1/4 WATT CARBON RESISTOR

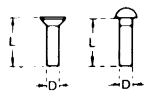
	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0K	1-246-473-00	10K	1-246-497-00	100K	1-246-521-00	1.0M	1-246-545-00
1.1	402-00	11	426-00	110	450-00	1.1K	474-00	11K	498-00	110K	522-00	1.1M	814-00
1.2	403-00	12	427-00	120	451-00	1.2K	475-00	12K	499-00	120K	523-00	1.2M	815-00
1.3	404-00	13	428-00	130	452-00	1.3K	576-00	13K	500-00	130K	524-00	1.3M	816-00
1.5	405-00	15	429-00	150	453-00	1.5K	577-00	15K	501-00	150K	525-00	1.5M	817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6K	1-246-578-00	16K	1-246-502-00	160K	1-246-526-00	1.6M	1-246-818-00
1.8	407-00	18	431-00	180	455-00	1.8K	579-00	18K	503-00	180K	527-00	1.8M	819-00
2.0	408-00	20	432-00	200	456-00	2.0K	580-00	20K	504-00	200K	528-00	2.0M	820-00
2.2	409-00	22	433-00	220	457-00	2.2K	581-00	22K	505-00	220K	529-00	2.2M	821-00
2.4	410-00	24	434-00	240	458-00	2.4K	582-00	24K	506-00	240K	530-00	2.4M	754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7K	1-246-583-00	27K	1-246-507-00	270K	1-246-531-00	2.7M	1-246-755-00
3.0	412-00	30	436-00	300	460-00	3.0K	584-00	30K	508-00	300K	532-00	3.0M	756-00
3.3	413-00	33	437-00	330	461-00	3.3K	585-00	33K	509-00	330K	533-00	3.3M	757-00
3.6	414-00	36	438-00	360	462-00	3.6K	586-00	36K	510-00	360K	534-00	3.6M	758-00
3.9	415-00	39	439-00	390	463-00	3.9K	587-00	39K	511-00	390K	535-00	3.9M	759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3K	1-246-488-00	43K	1-246-512-00	430K	1-246-536-00	4.3M	1-246-760-00
4.7	417-00	47	441-00	470	465-00	4.7K	489-00	47K	513-00	470K	537-00	4.7M	761-00
5.1	418-00	51	442-00	510	466-00	5.1K	490-00	51K	514-00	510K	538-00	5.1M	762-00
5.6	419-00	56	443-00	560	467-00	5.6K	491-00	56K	515-00	560K	539-00		
6.2	420-00	62	444-00	620	468-00	6.2K	492-00	62K	516-00	620K	540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8K	1-246-493-00	68K	1-246-517-00	680K	1-246-541-00		
7.5	422-00	75	446-00	750	470-00	7.5K	494-00	75K	518-00	750K	542-00		
8.2	423-00	82	447-00	820	471-00	8.2K	495-00	82K	519-00	820K	543-00		
9.1	424-00	91	448-00	910	472-00	9.1K	496-00	91K	520-00	910K	544-00		

HARDWARE NOMENCLATURE

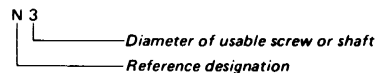
Screw:



Unless otherwise indicated, it means cross-recessed head (Phillips type).



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
<b>SCREWS</b>			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazer-head screw	

Reference Designation	Shape	Description	Remarks
<b>SELF-TAPPING SCREWS</b>			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
<b>SET SCREWS</b>			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
<b>NUT</b>			
N		nut	
<b>WASHERS</b>			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
<b>RETAINING RINGS</b>			
E		retaining ring	
G		grip-type retaining ring	





# SONY COLOR VIDEO PROJECTION SYSTEM KP-5020/7220


*US Model*

Chassis No. KP-5020 : SCC-316A-A  
KP-7220 : SCC-317A-A

## WARNING!!







AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.


## SAFETY-RELATED COMPONENT WARNING !!




COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

## SCHEMATIC DIAGRAM

### Note:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. p :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{4}\text{W}$  unless otherwise noted. k : 1000 $\Omega$ , M : 1000k $\Omega$
-  : nonflammable resistor.
-  : internal component.
-  : panel designation.
- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by  make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by  and repeat the adjustment until the specified value is achieved.  
(Refer to HV HOLD DOWN and HV REG Adjustments on page 42 - 44).
- When replacing the part in below table, be sure to perform the related adjustment.

Part replaced (  )	Adjustment
G board, DC block R904, IC501, Q801, Q802, Q803, D502, D801, D802, D803, R517, R802, R803, R804, R809, R825, C806, C807, T801	HV HOLD DOWN ADJUSTMENT (R803/804) HV REG ADJUSTMENT (R815/816)
R905, Q806, Q807, D807, D808, D809, D810, R814, R815, R816, R826, Q808, Q904	HV REG ADJUSTMENT (R815/816)

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 20,000-ohm-per-volt VOM.
-  : adjustment for repair.
- Readings are taken with a color-bar video signal input.
- Voltage variations may be noted due to normal production tolerances.
-  : B+ bus.
-  : When this portion is touched with the probe of a VOM, the set will be turned off. (Q806 base on G board)

**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.



SONY  
COLOR VIDEO  
PROJECTION  
SYSTEM  
KP-5020/7220


US Model

Chassis No. KP-5020 : SCC-316A-A  
KP-7220 : SCC-317A-A







WARNING!!


AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS. THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING !!

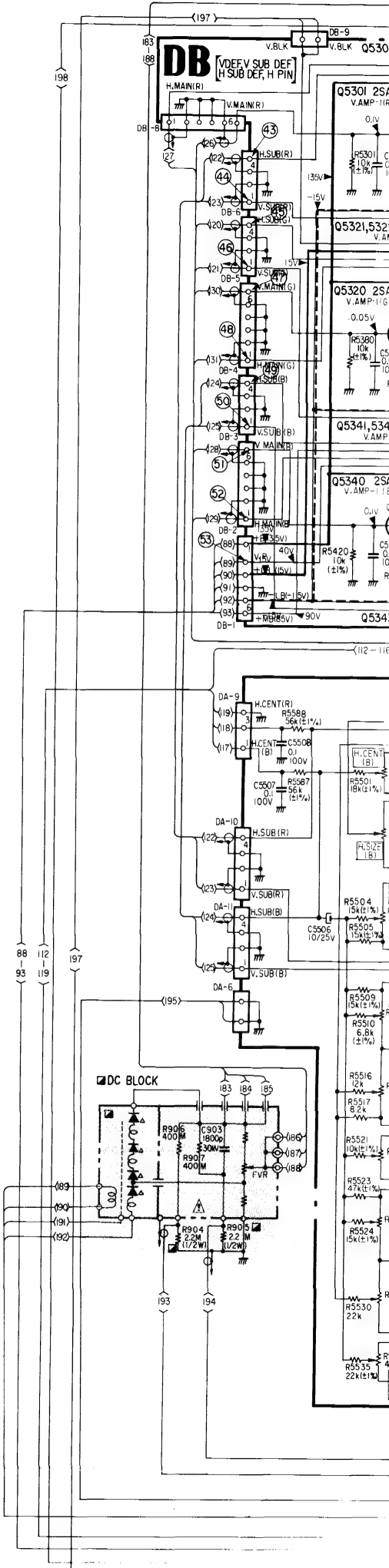
COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

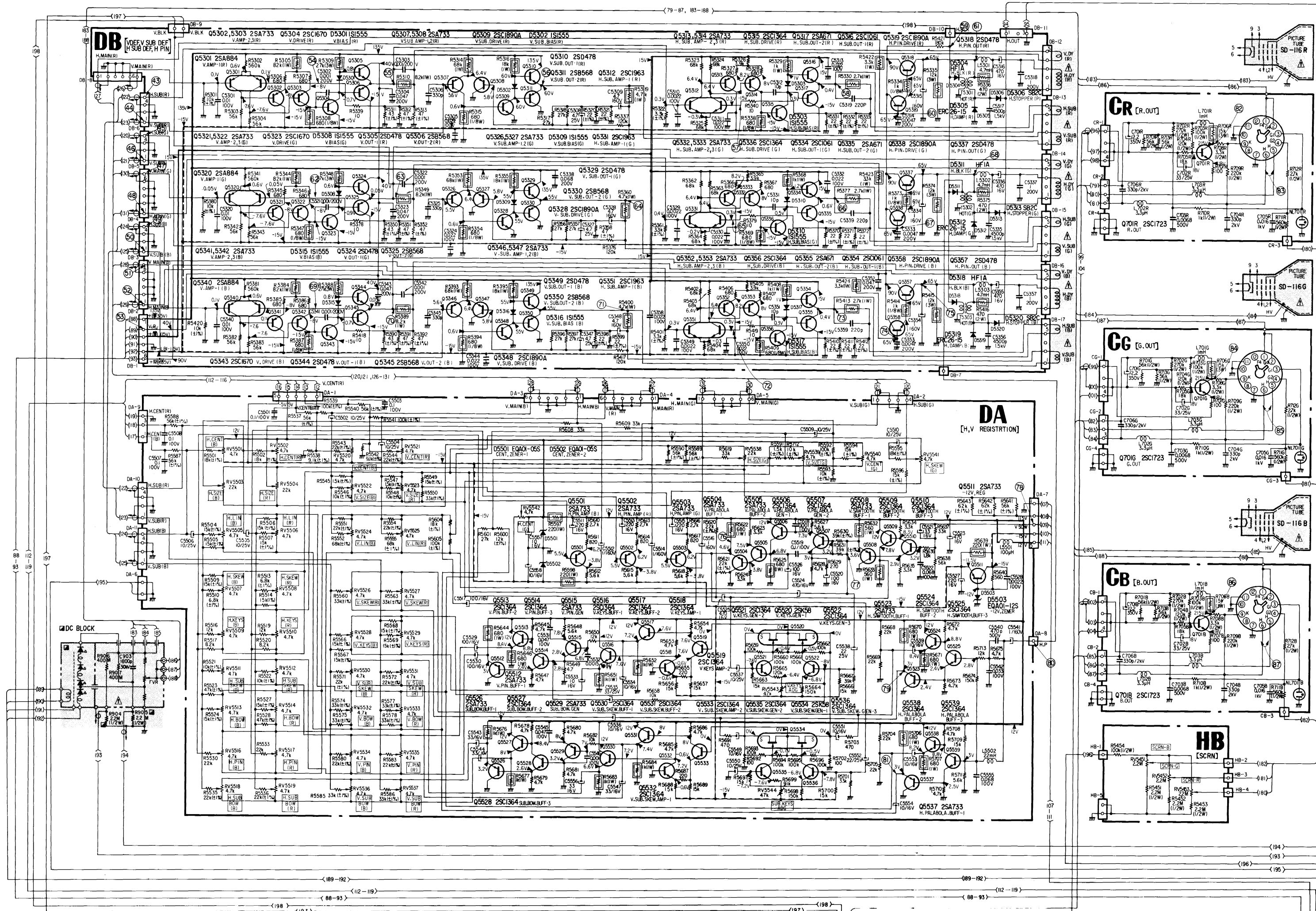
Note:

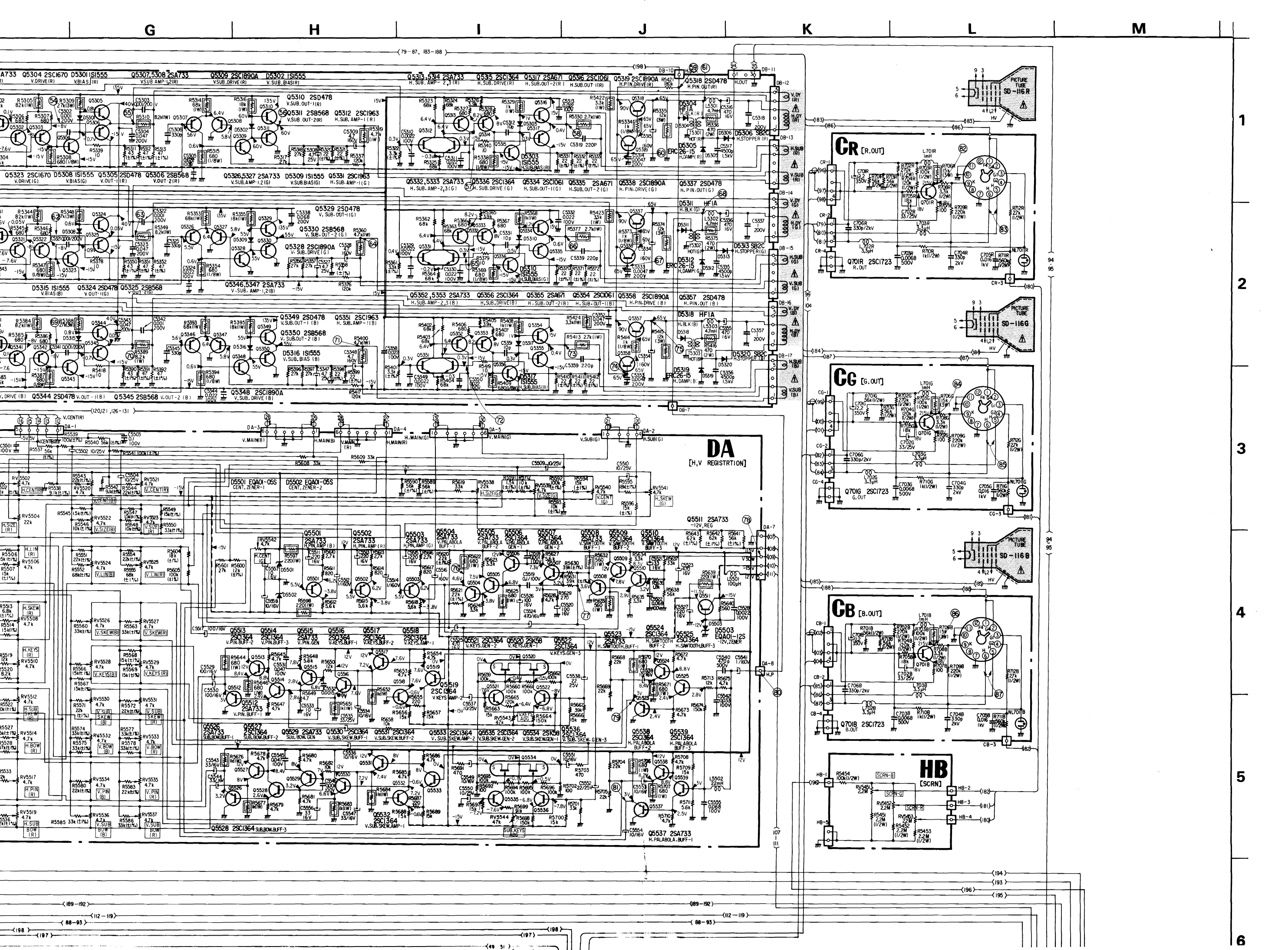
- All capacitors are in  $\mu\text{F}$  unless otherwise noted. p :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{4}\text{W}$  unless otherwise noted. k : 1000 $\Omega$ , M : 1000k $\Omega$
-  : nonflammable resistor.
-  : internal component.
-  : panel designation.
- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by  make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by  and repeat the adjustment until the specified value is achieved.  
(Refer to HV HOLD DOWN and HV REG Adjustments on page 42 – 44).
- When replacing the part in below table, be suer to perform the related adjustment.

Part replaced (  )	Adjustment
G board, DC block R904, IC501, Q801, Q802, Q803, Q502	HV HOLD DOWN ADJUSTMENT

SCHEMATIC DIAGRAM







necessary adjustments indicated. If results do not meet the specified value, change the component identified by **M** and repeat the adjustment until the specified value is achieved.

(Refer to HV HOLD DOWN and HV REG Adjustments on page 42 - 44).

- When replacing the part in below table, be sure to perform the related adjustment.

Part replaced ( <b>M</b> )	Adjustment
G board, DC block R904, IC501, Q801, Q802, Q803, D502, D801, D802, D803, R517, R802, R803, R804, R809, R825, C806, C807, T801	HV HOLD DOWN ADJUSTMENT (R803/804) HV REG ADJUSTMENT (R815/816)
R905, Q806, Q807, D807, D808, D809, D810, R814, R815, R816, R826, Q808, Q904	HV REG ADJUSTMENT (R815/816)

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a 20,000-ohm-per-volt VOM.
- M** : adjustment for repair.
- Readings are taken with a color-bar video signal input.
- Voltage variations may be noted due to normal production tolerances.
- : B+ bus.
- ◆ : When this portion is touched with the probe of a VOM, the set will be turned off. (Q806 base on G board)

**Note:** The components identified by shading and mark **M** are critical for safety. Replace only with part number specified.

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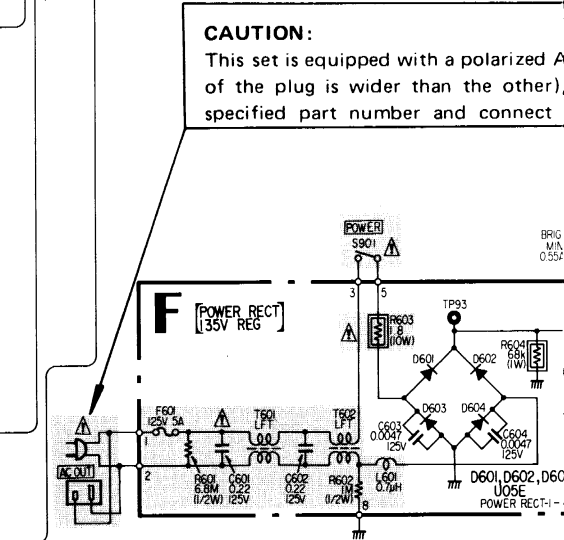
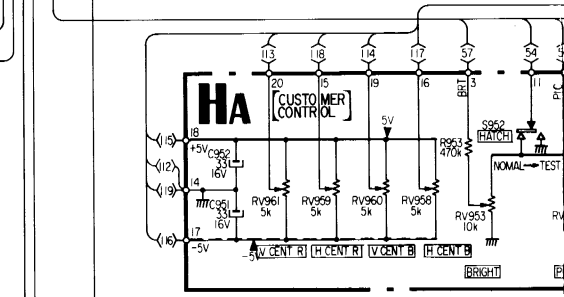
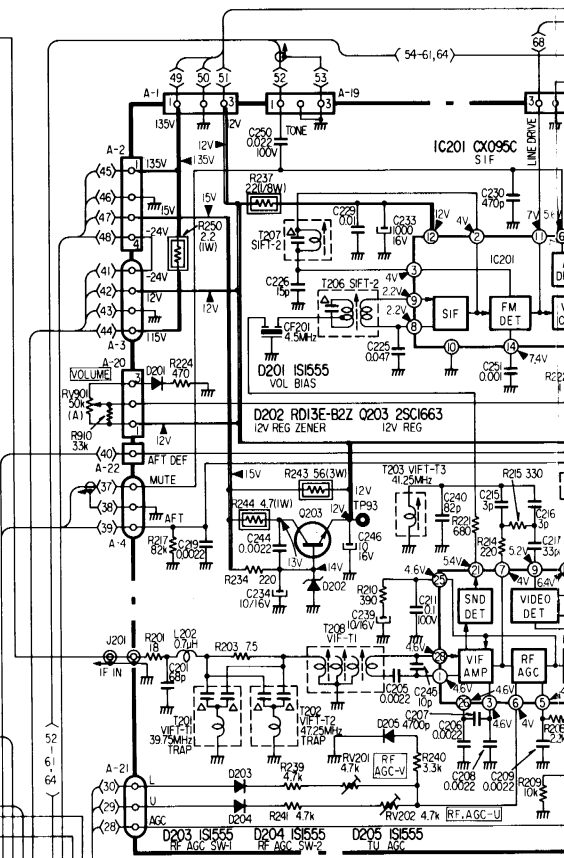
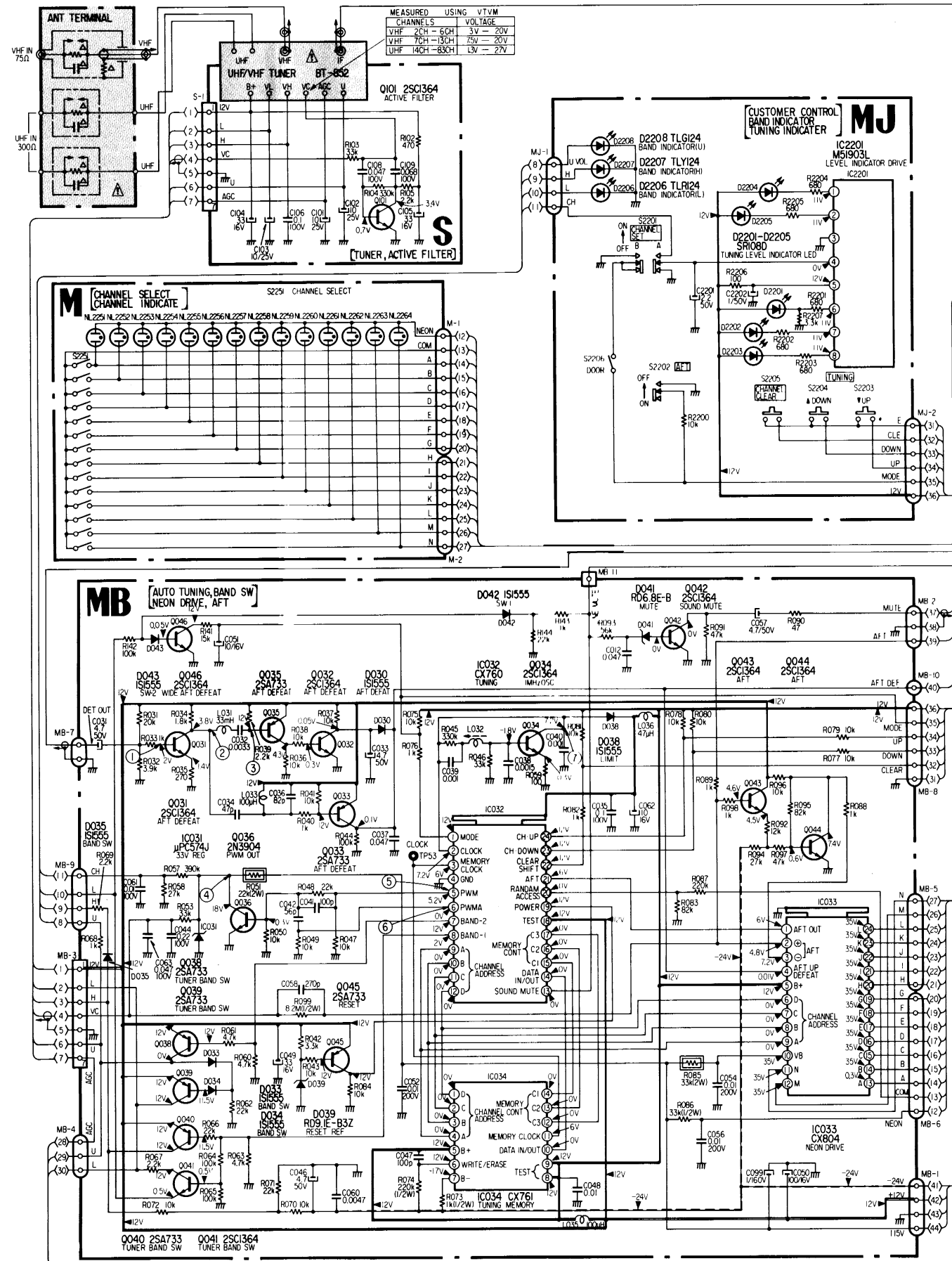
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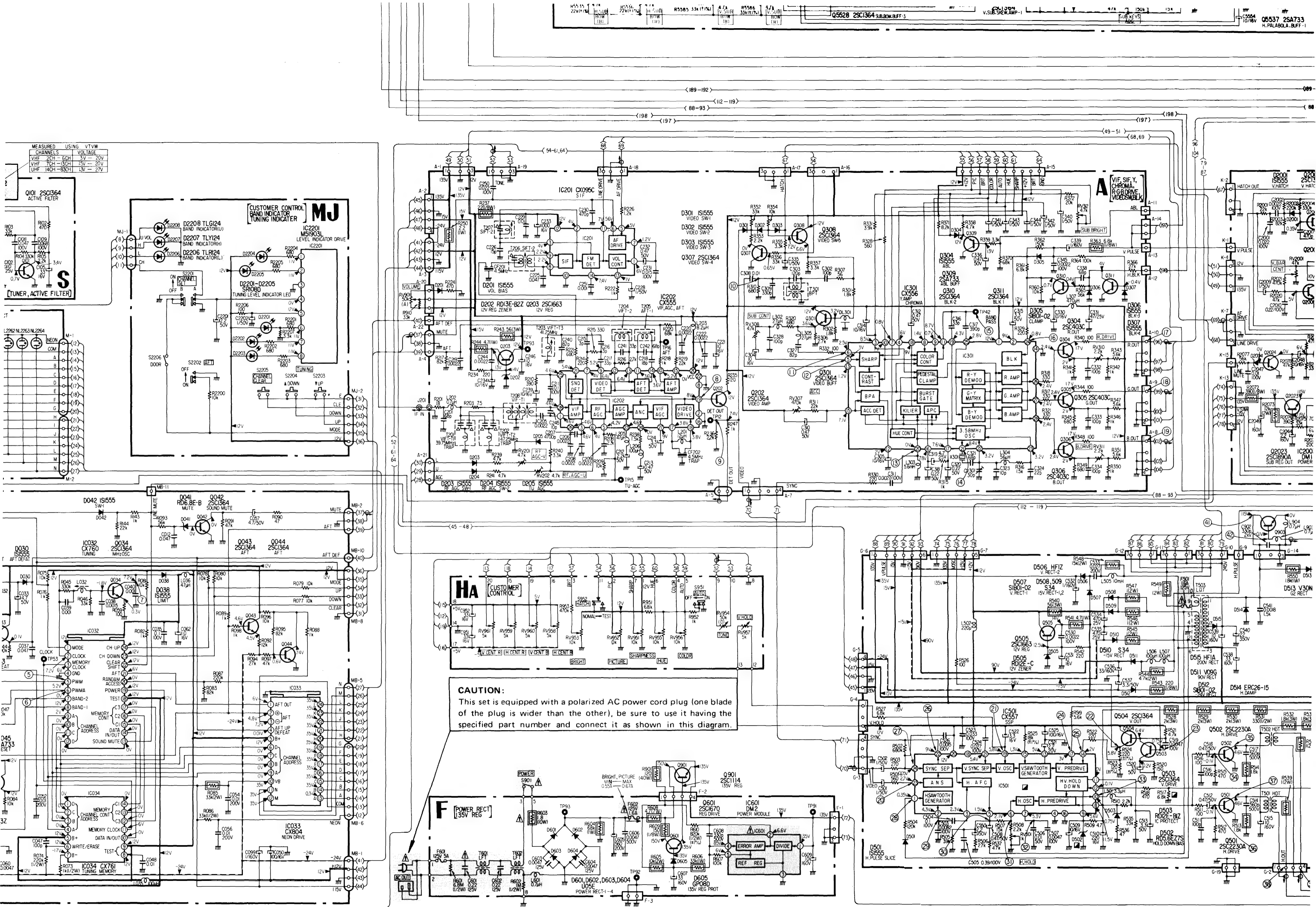
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**SONY®**

# **CIRCUIT DESCRIPTION**

**COLOR VIDEO PROJECTION SYSTEM  
(KP-5020/7220)**

**1980, November**

**KP-1**

**SONY CORPORATION  
TV & CONSUMER VIDEO DIVISION  
OSAKI-SP**

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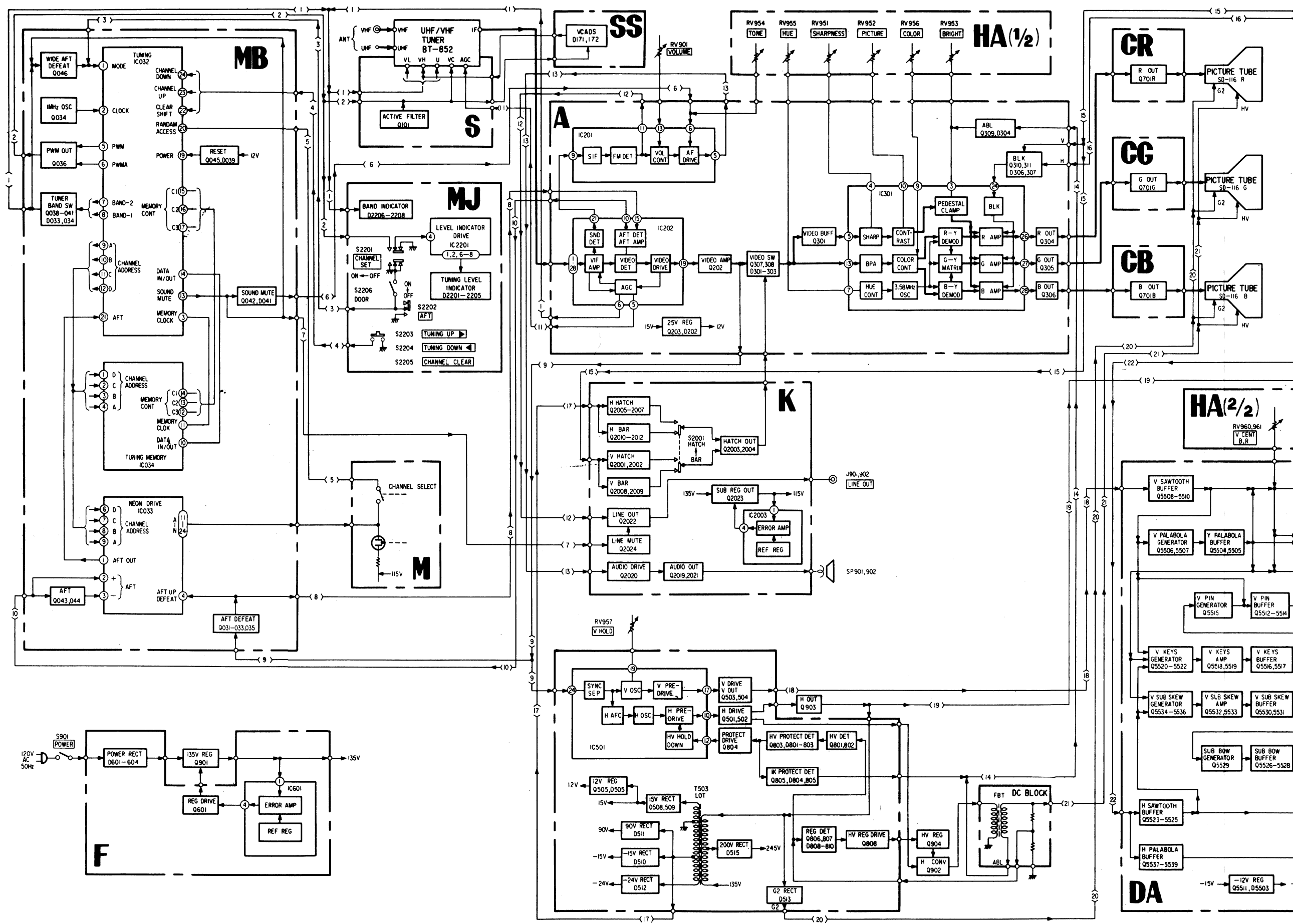
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## 1. OUTLINE

This color video projection system has three lenses and three picture tubes, thus it is necessary to contain three deflection circuits and three video out circuit for red, green and blue.

Most of the circuits (tuning, VIF, SIF, Y, CHROMA, H OSC, V OSC and power supply circuits) of this set are same as that of the alpha chassis color TV.

This circuit description is provided for each board as follows.





2. M, MB, MJ and S Board

2-1 TUNING PROCESSING CIRCUIT

The tuning processing circuit consists mainly of three ICs--IC032, IC033, and IC034. The function of each IC is as follows:

IC032 (Control-1) -- This IC is used to synchronize all the logic operations which take place in the tuning process.

Pin 1 (Mode): The voltage level applied to this pin determines the mode of IC032 as stated below

Pin 1	Mode
12 Vdc	AFT on
6 Vdc	AFT off
0 Vdc	Program

Pin 2 (CLK in): 1 MHz main clock; input is used as a reference for all the logic operations.

Pin 3 (CLK out): 15,625 Hz clock derived from main clock.

Pins 5 and 6 (PWM): Pulse-width modulation signal output. The pulse width of this signal is different for each selected channel. This signal is used to produce the VC voltage for the tuner.

Pins 7 and 8 (Band): Band select output. The logic level at these pins determines the tuning range of the tuner.

Pins 9-12 (Channel Address): Address lines. The four address lines developed by IC032 identify the 14-channel location.

ADDRESS LINES		A	B	C	D
14 CHANNEL LOCATIONS	A	L	L	L	L
	B	H	L	L	L
	C	L	H	L	L
	D	H	H	L	L
	E	L	L	H	L
	F	H	L	H	L
	G	L	H	H	L
	H	H	H	H	L
	I	L	L	L	H
	J	H	L	L	H
	K	L	H	L	H
	L	H	H	L	H
	M	L	L	H	H
	N	H	L	H	H

L = Low = 0 Volts  
H = High = 12 Volts

Pin 13 (Sound Mute): A High pulse is developed during Power-on and channel switching.

Pin 14 (DATA I/O): Data input/output line. The digital information corresponding to each channel location is written (stored) into the memory or is read out from the memory through this line.

Pin 15-17 (Memory control): Control lines. The logic level out at these pins controls the logic state of the tuning memory (IC034) write, read, standby, last channel memory, change I/O line to input or output.

Pin 19 (Power on): This pin goes High when the power is turned on. During this time, IC032 reads the last-channel memory from IC034 and tunes it in.

Pin 20 (RA): Random access reset. A High pulse is applied to this pin every time a channel is randomly selected.

Pin 21 (AFT): AFT correction for the PWM signal.

AFT	MODE
12 V	AFT UP
6 V	--
0 V	AFT DOWN

Pin 22  
(CLEAR): Normally High level. A low level clears the memory corresponding to the tuned channel location.

Pin 24  
(CH UP): Normally High level. A low level pulse tunes in the next higher active channel.

Pin 23  
(CH DOWN): Normally High level. A low level pulse tunes in the next lower active channel.

IC033 (NEON DRIVE) -- This IC performs two functions: (a) to drive the channel indicator neon lamps, and (b) to sense if the AFT is tuning up or down.

IC034 (TUNING MEMORY) -- Stores the digital data which is necessary to tune in a channel. The data is stored into the 14 memory locations during programming.

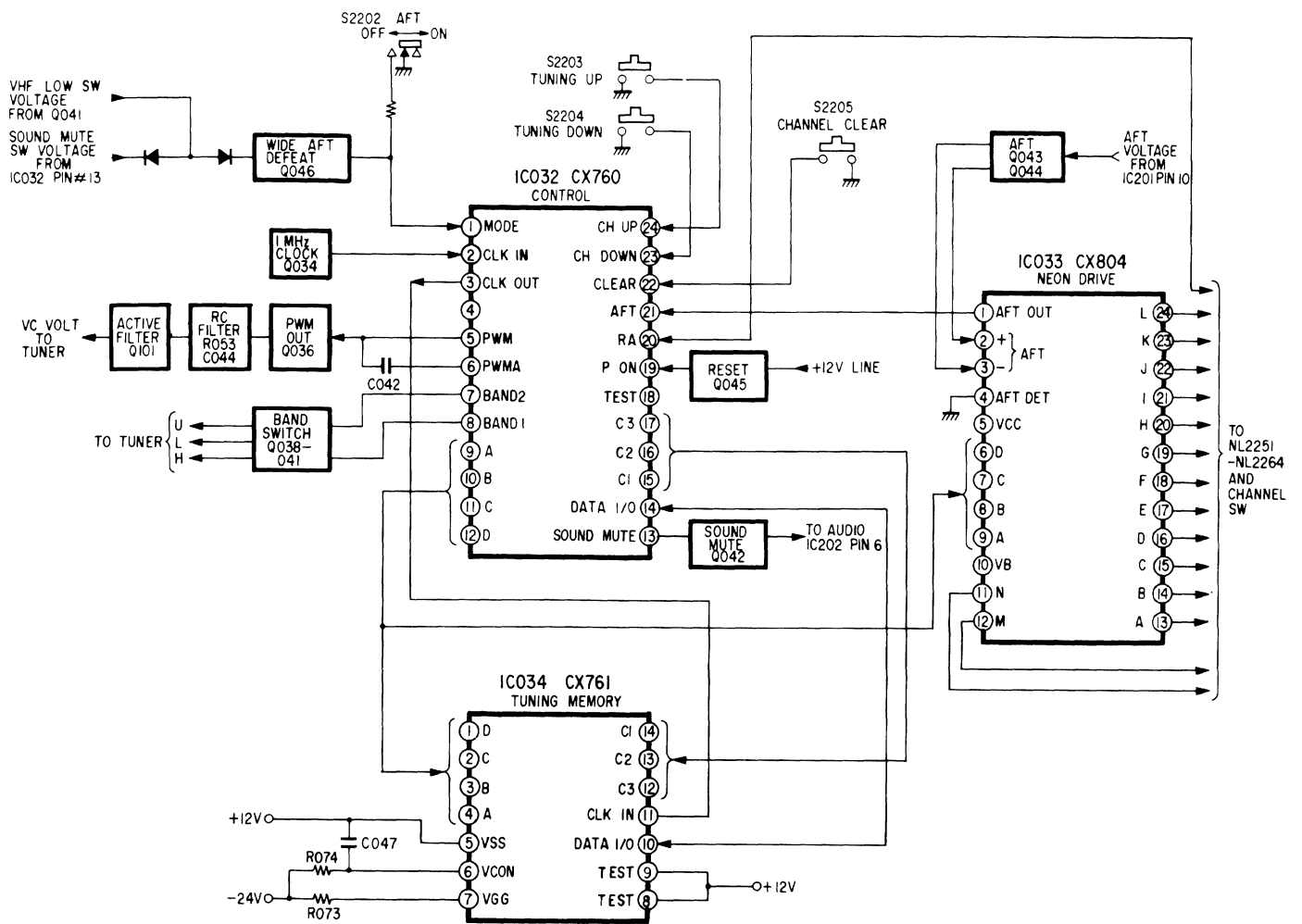
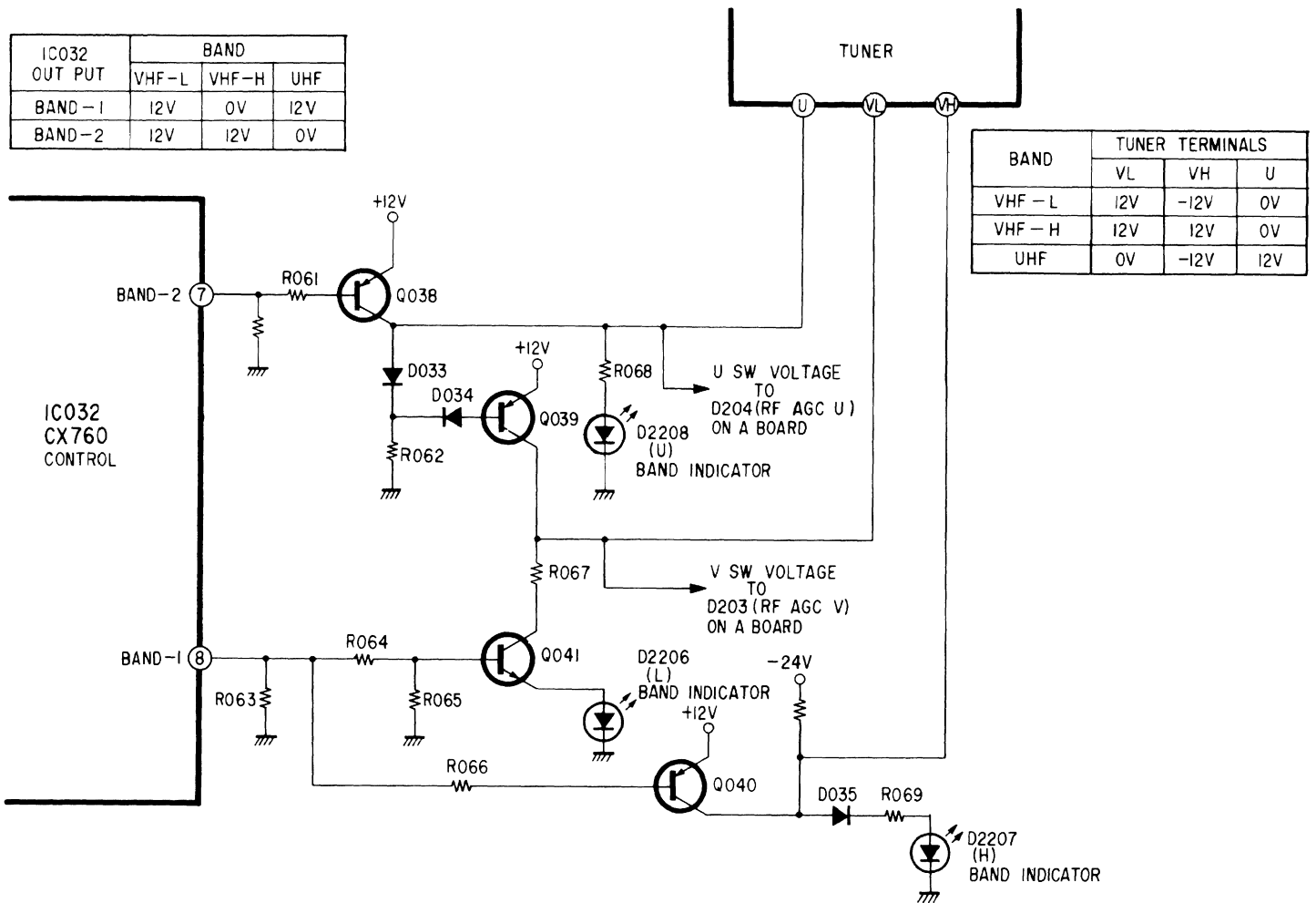


FIG. 1 TUNING PROCESSING CIRCUIT

# 2-2 TUNER BAND SELECT CIRCUIT



## 2-3 SYNC DET AND STOP CIRCUITS

This circuit consists of Q031, Q032, Q033 and Q035. The purpose of this circuit is to stop the search mode of this system.

The video signal at the DET OUT is amplified by Q031 and the horizontal sync component of this amplified signal turns on Q035 and Q032. The voltage at pin 4 of IC 033 is low, so that the tuning action is stopped. If the video signal at the DET OUT has not appeared, Q032 remains off and the voltage at pin 4 of IC033 is high, and the search mode continues.

C034, L033 and C036 detect the sound signals of other channels and prevent the misoperation of this circuit. When the sound signal of another channel appears at the DET OUT, it turns Q035 and Q032 on. But C034, L033 and C036 which form a filter circuit pass the sound signal and the signal turns Q033 on, applying B+ voltage to the pin 4 of IC033. The search mode is thereby continued and the misoperation is prevented.

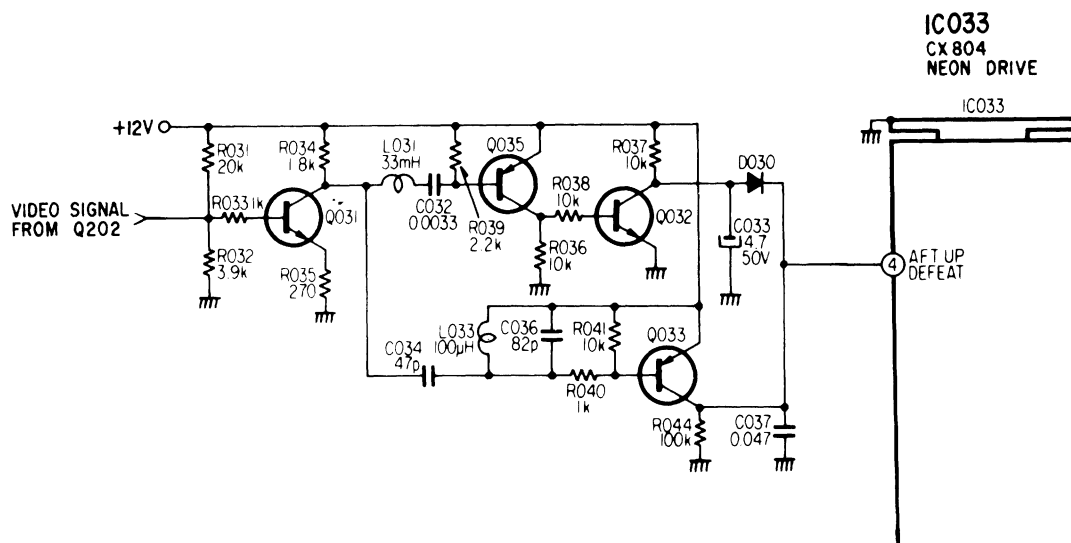


FIG. 3. SYNC DET AND STOP CIRCUITS



## 2-4 VC PROCESSING CIRCUIT

The tuning frequency of the VHF/UHF tuner is determined by the DC voltage applied to the VC terminal of the tuner. The DC voltage range applied to the tuner for each of the three tuning bands (VHF Low, VHF High, UHF) is shown on the VC processing circuit schematic. This DC voltage is developed by filtering the pulse-width modulation signal provided by IC032 pins 5 and 6.

The PWM signal consists of a series of constant pulses whose pulse width is preset according to the channel selected. A PWM signal with a narrow pulse width will result in a low-level DC voltage after it is filtered; a signal with a wide pulse width will result in a higher DC voltage.

The PWM signal is filtered by an RC network (R053, C044) and by an active filter, Q101. In order to prevent frequency drifts in the tuner, the AFT correction voltage is applied to the VC line of the tuner.

The function of IC2201 and the LEDs connected to its output is to indicate the approximate tuning level within each selected band. This function is used only during the programming mode (channel set on) of the tuning circuits. As the VC voltage applied to pin 4 of IC2201 increases during "tuning up", the number of LEDs that will turn on will also increase. The converse is true during "tuning down". During the nonprogrammable mode (channel set off), IC2201 is disabled by S2201 (CHANNEL SET).

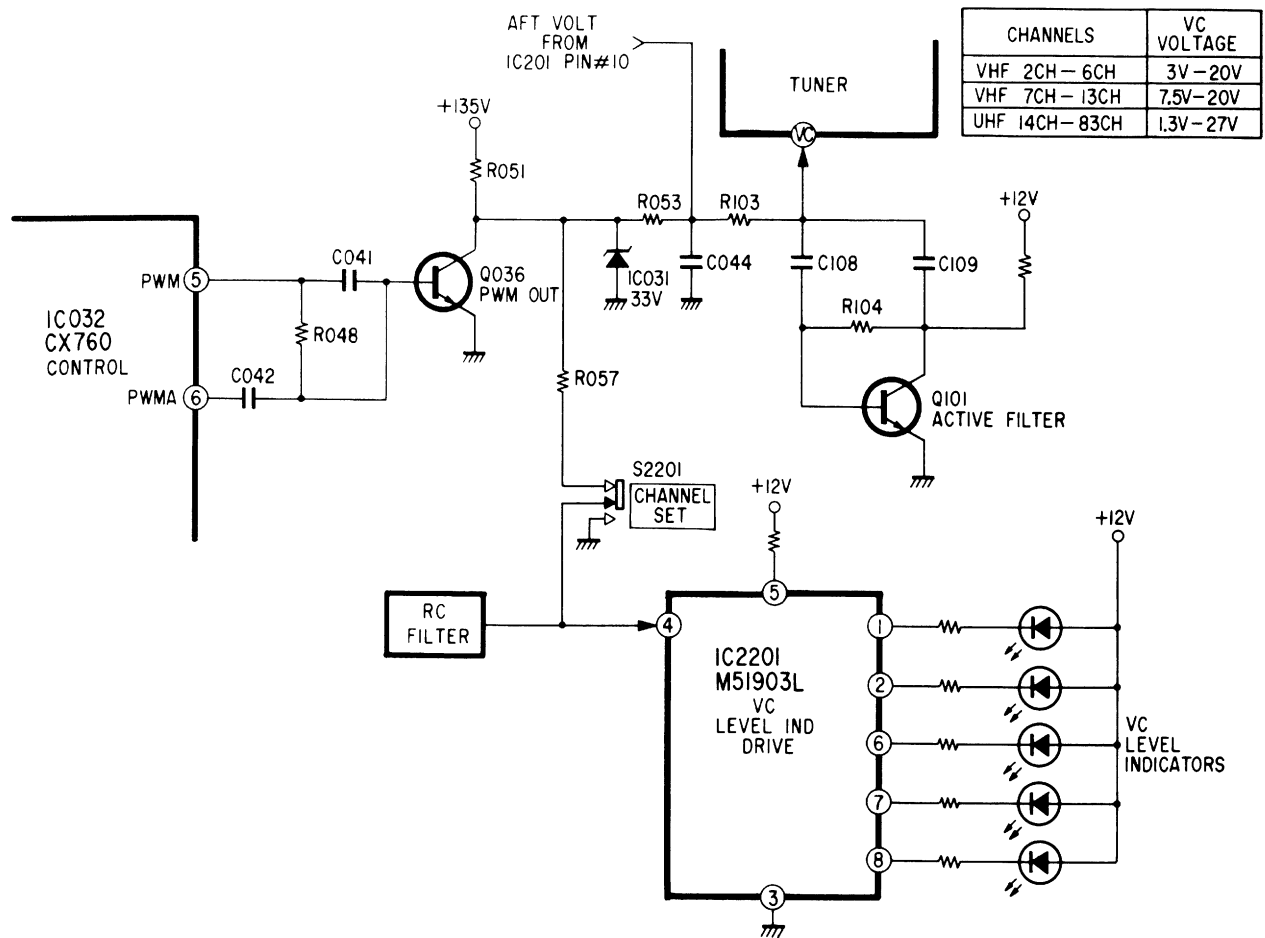


FIG. 4 VC PROCESSING CIRCUIT

### 3. A BOARD

A board has luminance, chroma processing, VIF, AFT, AGC and SIF circuits.

#### 3-1 LUMINANCE CIRCUIT

The composite video signal from IC202 is delayed and has the chroma trapped out prior to entering IC301 at pin 5. The subcontrast control RV308 adjusts the signal level of the video signal entering the IC.

The first luminance stage in IC301 is the sharpness amplifier. High-frequency peaking is accomplished by L305/C327/R332 off pin 6, and picture sharpness is adjusted by the customer Sharpness control, RV951, which varies the DC voltage applied to pin 4 of the IC.

Next, the luminance signal is amplified by the contrast amplifier. The gain of this amplifier is adjusted by the customer Picture control, RV952, which varies the DC voltage applied to pin 10. This control also varies the gain of the color-control stage.

The pedestal-clamp stage which follows amplifies and clamps the pedestal of the luminance signal to a fixed DC level. This is accomplished by a horizontal pulse coupled from the sync separator (IC501) to pin 20 of IC301. The DC level is filtered by C315 at pin 2 of IC301. The Brightness control (RV953) and sub-brite control (RV312) are connected to the pedestal clamp through pin 3. The ABL line, also connected to pin 3, limits the beam current by reducing the conduction of the pedestal-clamp stage if beam current exceeds normal operation levels.

The luminance signal is then coupled to the RGB amplifiers within IC301. It is here that retrace blanking occurs. The vertical and horizontal blanking pulses are coupled through pin 24 of IC301 to the blanker stage which cuts off the RGB amps during retrace time.

The luminance signal leaves IC301 through pins 26, 27, and 28 where it is coupled to the RGB output stage on the C Board. During a color program, the luminance signal is matrixed with the chroma signal in the R, G, and B amps in IC301 and the RGB signals are coupled to the RGB output stage from pins 26, 27 and 28 of IC301.

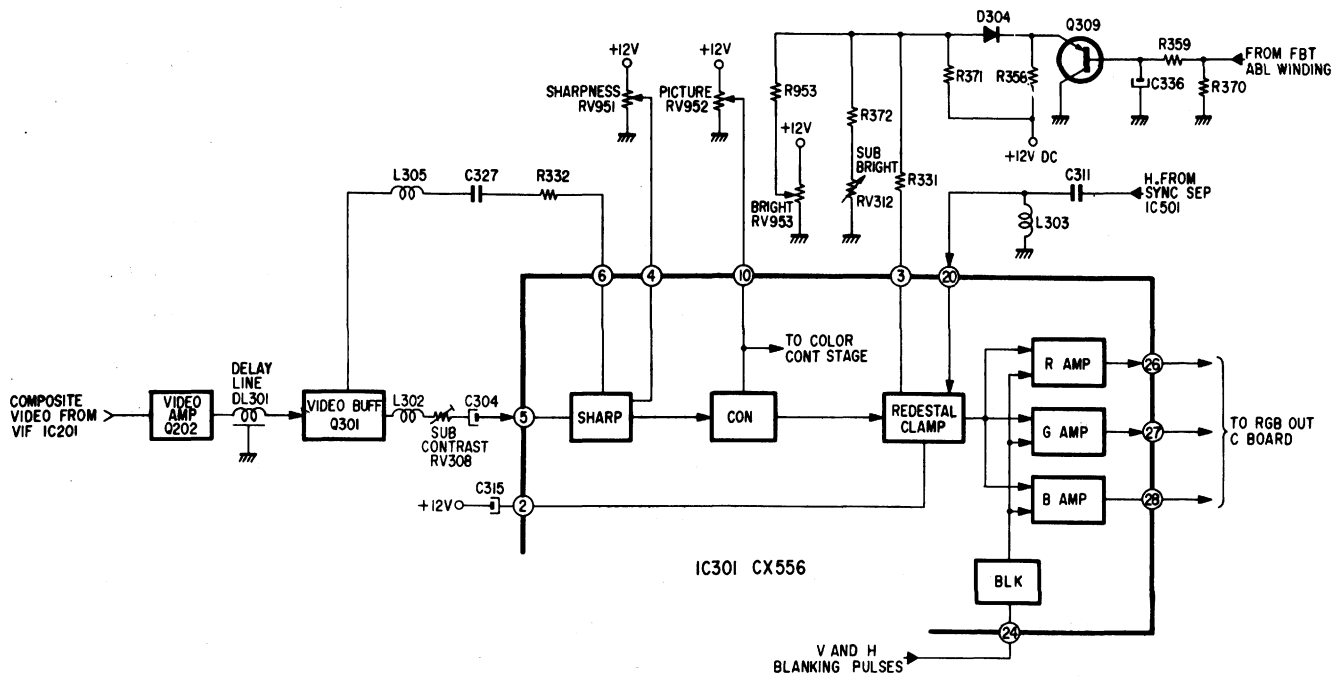


FIG. 5 LUMINANCE CIRCUIT

### 3-2 CHROMA PROCESSING

The processing of the chroma signal occurs in IC301. The chroma signal is removed from the composite video signal by bandpass transformer (BPT) T301 and enters IC301 at pin 13.

The first chroma stage is the bandpass amplifier (BPA), whose gain is controlled by the ACC detector. The ACC detector receives a sample of the chroma signal from pin 19 of IC301 and uses a horizontal pulse from pin 20 of the IC to remove the burst signal. The ACC detector then varies the gain of the bandpass amplifier with changes in burst amplitude to maintain a constant chroma signal level at its output, this level being determined by the setting of the ACC control RV307.

The next chroma stage is the color-control stage which amplifies the chroma signal and further increases the amplitude of only the burst signal. The additional burst signal amplification is accomplished by the burst-gate stage (B Gate). The burst-gate stage uses a sample of the chroma signal from the bandpass amplifier and a horizontal pulse from pin 20 of IC301 to turn on the B

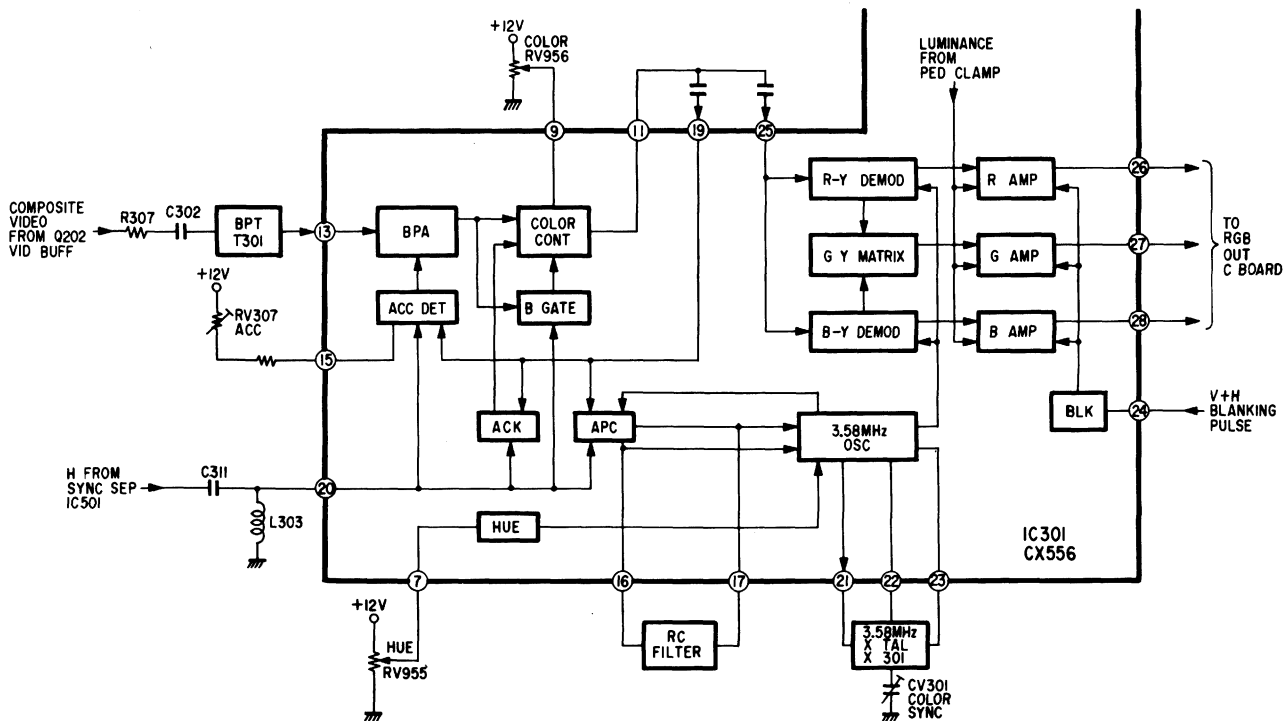


FIG. 6 CHROMA CIRCUIT

Gate at burst time, providing additional gain at the color-control stage at this time. The color-control stage is held off during black-and-white programs by the automatic-color-killer stage (ACK). The ACK stage receives a sample of the chroma signal from pin 19 of IC301 and uses a horizontal pulse from pin 20 of the IC to remove the burst signal. When the burst signal is present (color program), the ACK stage has no effect on the colorcontrol stage; however, when the burst signal is not present (black-and-white program) the ACK stage turns off the color control stage. The chroma signal output of the color-control stage is coupled out of IC301 at pin 11 and into the chroma demodulators at pin 25 of IC301.

The chroma demodulators require two signals: a chroma signal (pin 25, IC301) and a 3.58 MHz CW signal. The 3.58 MHz CW signal is phase and frequency locked to the incoming burst signal and is coupled to the demodulators from the 3.58 MHz crystal oscillator in IC301. The free-running frequency of this oscillator is determined primarily by the 3.58 MHz crystal X301 (pins 21-23 of IC301) and can be adjusted to a small degree by the color-sync control CV301. The 3.58 MHz crystal oscillator is phase and frequency locked to the incoming burst signal by the APC circuit in IC301. The APC circuit receives a sample of the incoming chroma signal from pin 19 of IC301 and uses a horizontal pulse from pin 20 of the IC to remove the burst signal. It then compares the burst signal to a sample of the oscillator CW signal and produces a double-ended correction voltage, filtered at pins 16 and 17, that locks the oscillator on frequency. The 3.58 MHz CW output from the oscillator is coupled to the chroma demodulators in IC301.

IC301 uses two demodulators for chroma demodulation -- an R-Y demodulator and a B-Y demodulator. A portion of each demodulator output is coupled to the G-Y matrix. The three color-difference signals (R-Y, G-Y, and B-Y) are then coupled to the R, G, and B amplifiers in IC301. It is here that the luminance and chroma signals are matrixed to produce the R G B output signals at pins 26, 27, and 28 of IC301.

### 3-3 VIDEO SWITCH CIRCUIT

D301 through D303 and Q307 form the switch circuit. When the TEST/NORMAL switch is NORMAL position, pin 3 of A-16 connector is 12 V and Q307 goes on. Thus the video signal is supplied to Q308 base through D301 and D302 and the bar or hatch pulse from K Board is cut off by D303.

When the TEST/NORMAL switch is TEST position, pin 3 of A-16 connector is grounded and Q307 goes off. The bar or hatch pulse is supplied to Q308 base and the video signal is cut off.

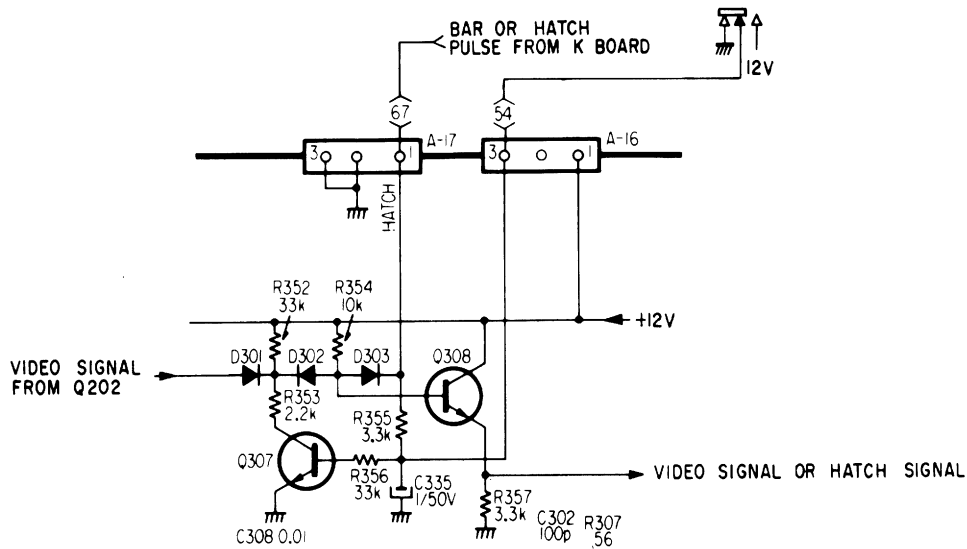


FIG. 7. VIDEO SWITCH CIRCUIT





#### 4. G BOARD

The G board has horizontal and vertical oscillator/drive/output, high voltage protector/regulator, cathode current protector and scan driven voltage supply circuits.

##### 4-1 SYNC SEPARATOR AND DEFLECTION PROCESSING

The following stages are contained in IC501: sync separator, vertical oscillator/sawtooth generator, horizontal oscillator/AFC and high-voltage hold down.

##### SYNC SEPARATOR

The sync separator stage receives the composite video signal at pin 24 of IC501 and removes the vertical and horizontal sync pulses. An automatic noise cancelling (ANC) circuit is used in conjunction with the sync separator to prevent noise pulses from affecting the sync separator operation. The sync separator uses feedback between pins 22 and 24 of IC501 to increase stability. The output of the sync separator is coupled to the Y-chroma chip IC301 (see Luminance Circuit), as well as to the vertical oscillator and horizontal AFC stage (IC501).

##### VERTICAL OSCILLATOR/SAWTOOTH GENERATOR

The vertical oscillator/sawtooth generator stage produces the vertical drive signal required for vertical deflection. The oscillator's free-running frequency is determined by C552, R527, and RV957 (V Hold) at pin 19 of IC501. Capacitor C524 (pin 21, IC501) is used to integrate the vertical sync pulse which locks the vertical oscillator on frequency.

The output of the vertical oscillator is shaped into a sawtooth waveform by the IC internal circuitry in conjunction with capacitor C521 at pin 13 of the IC. The vertical sawtooth is amplified by the vertical output stage. Feedback from the vertical output stage is coupled through pin 14 (IC501) to the vertical pre-drive stage in order to maintain uniform vertical linearity.

##### HORIZONTAL OSCILLATOR/AFC

The horizontal oscillator (IC501) has a free-running frequency determined by C506 and C507 at pin 7, as well as R508 and RV501



## 4-2 HIGH VOLTAGE HOLD DOWN CIRCUIT

The high voltage hold down circuit consists of Q801 through Q804. The divided high voltage from the DC block is supplied to the base of Q801 and the proportional voltage is obtained at Q802 emitter. Q803 compares the proportional voltage and the emitter voltage of Q803.

Q803 emitter is biased with the constant voltage by D801 through R806 (D802 and D803 are temperature compensation diodes). When the base voltage of Q803 becomes high, Q803 goes off and the collector voltage of Q803 becomes low, then Q804 goes off. The current from the 15V line charges up C803 through R809 and the voltage at pin 12 of IC501 is increased. The DC voltage at pin 12 of IC501 is compared to a 5.6 V reference at pin 12 of IC501 (zener diode D502). When the DC voltage at pin 12 of IC501 goes above the 5.6 V reference, the high-voltage hold down stage in IC501 turns on and it turns off the horizontal pre-drive stage and shuts down the horizontal output pulse. The line voltages generated in T503(LOT) then disappear. R803 and R804 provide a fine adjustment of the dividing voltage.

C801 through C803 eliminate pulse noise and prevent the false operation of the high voltage hold down circuit. C 513 and R535 also prevent the misoperation.

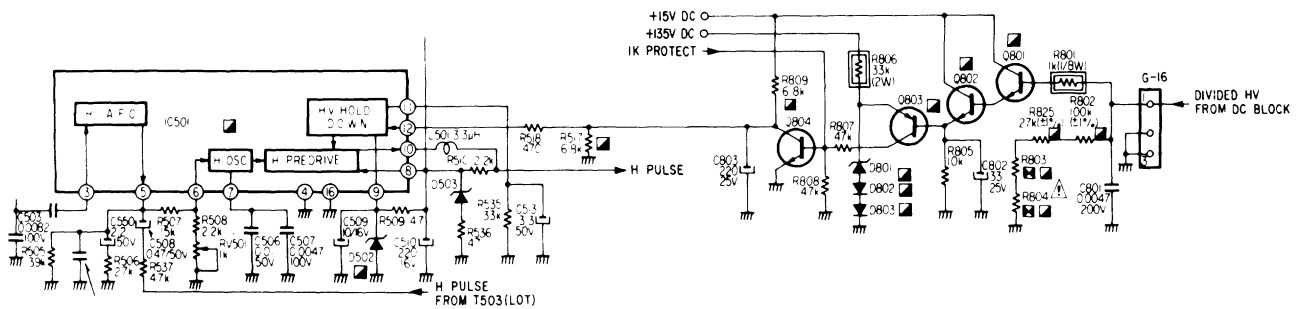


FIG. 9. HIGH VOLTAGE HOLD DOWN CIRCUIT

#### 4-3 IK PROTECT CIRCUIT (Cathode Current Protect Circuit)

This circuit consists of Q805, D804 and D805. When the cathode current of the picture tube flows, this current also flows through R822 and the negative voltage appears at R822. If the current is increased, the negative voltage at R822 will increase and supply the Q805 emitter. Q805 will then come on and Q804 turn off. The voltage at pin 12 of IC501 will increase and shut down the horizontal output pulse.

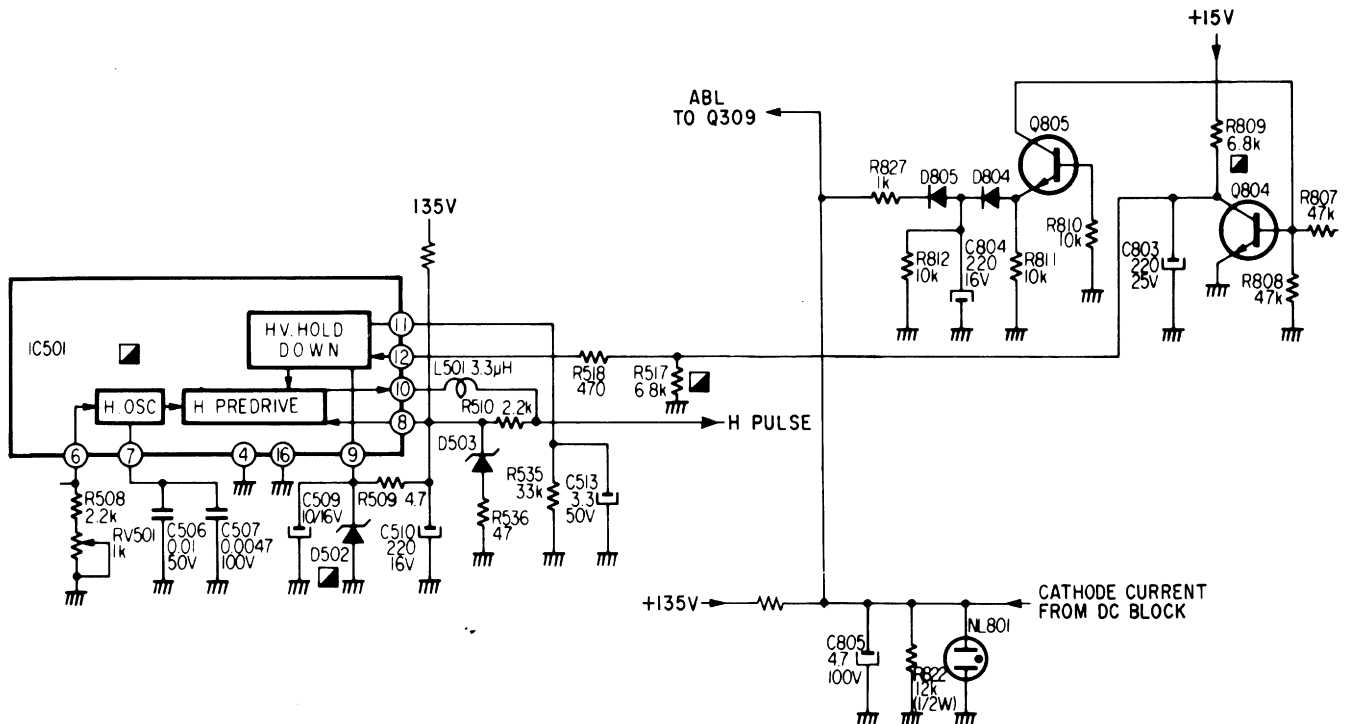


FIG. 10. IK PROTECT CIRCUIT

#### 4-4 HIGH VOLTAGE REGULATOR CIRCUIT

This circuit consists of Q806 through Q808 and Q904 and operates to obtain the constant high voltage for picture tubes.

The divided high voltage at DC block, R814, R826, R815 and R816 is supplied to Q806 base and Q807 emitter is biased with a constant voltage by D807 through D810. (D809 and D810 are temperature compensation diodes). When the high voltage becomes low, the divided voltage also becomes low. The current to Q806 and Q807 decreases and the voltage at Q807 and Q806 collectors becomes high. The bias voltage of Q808 increases and the drive voltage of Q904 also increases. Thus the convertor pulse at Q902 collector becomes large and the high voltage increases.

D806 is a damper diode and C807 is a resonance capacitor.

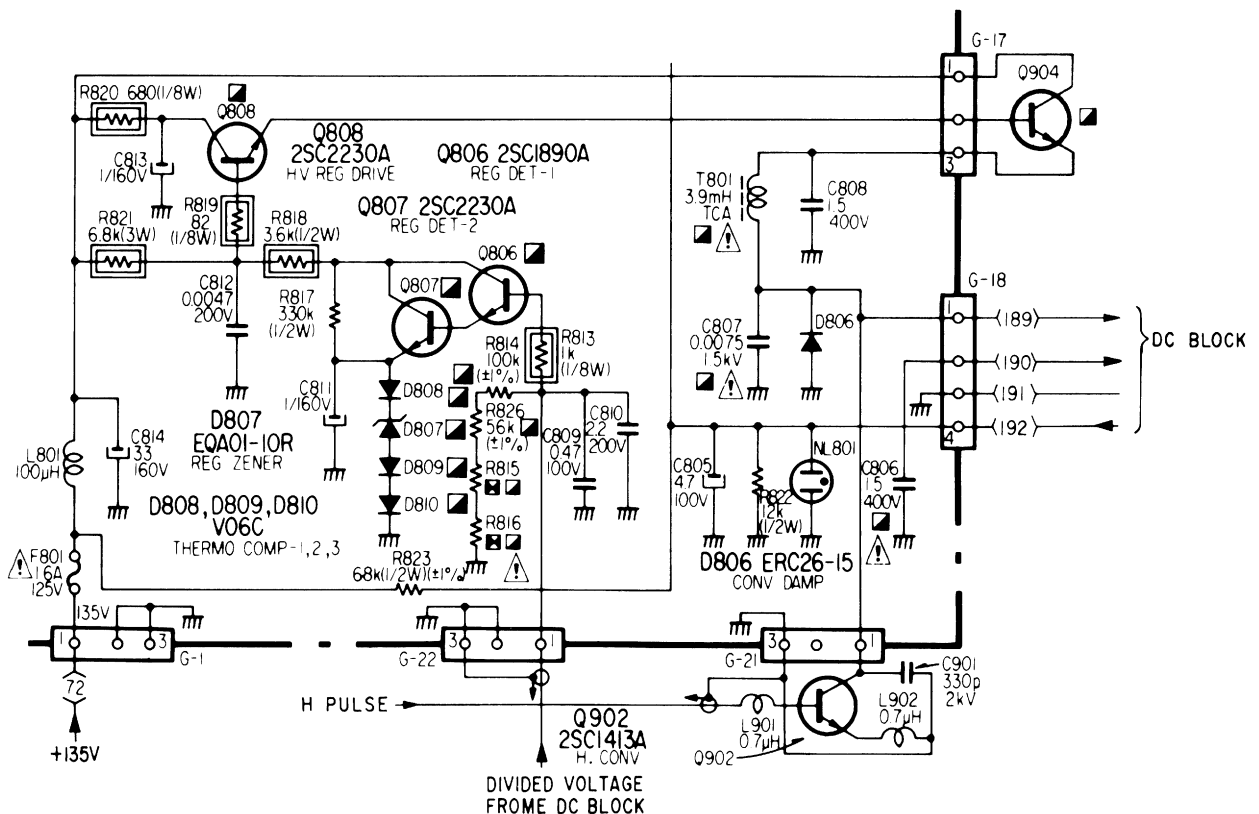
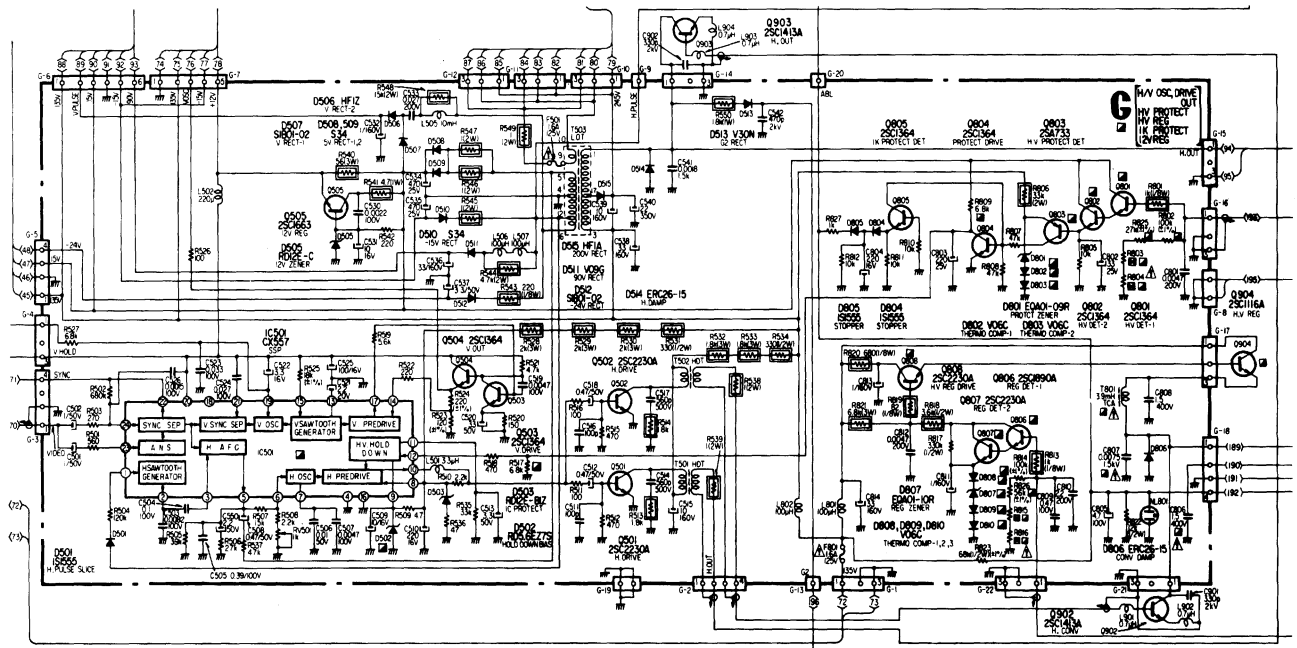


FIG. 11. HIGH VOLTAGE REGULATOR CIRCUIT

4-5 OTHER CIRCUIT

This system has separate horizontal output and high voltage convertor circuits. Q501 and T501 then drive the horizontal output transistor (Q903), and Q502 and T502 drive the high voltage convert transistor (Q902). T503 is a line voltage output transformer and applies  $\pm 15$  V, +90V, -24 V and +245 V.



GIG. 12. G BOARD

## 5. K Board

K board has the vertical bar and hatch signal generators, the horizontal bar and hatch signal generators, the audio amplifier for LINE OUT, the sound output amplifier and the 115 V regulator.

### 5-1 V HATCH GENERATOR

This circuit consists of Q2001 and Q2002.

The vertical sawtooth signal from the vertical amplifier (Q5324 and Q5325) on DB board is used for the signal source.

R2001 and C2001 form an integrator and eliminate the noise component from the input signal.

C2002 and R2002 through R2004 form the differentiation circuit.

D2001 applies the negative pulse to Q2001 base. When the negative pulse is applied to the base, Q2001 goes off. The charge current flows to C2003 through R2004.

Q2001 goes on when the charge voltage of C2003 becomes large enough. The negative pulse is then applied to the Q2002 base and Q2002 goes off. The charge current then flows to C2004 through R2007, and Q2002 goes on when the charge voltage of C2004 is large enough.

The negative pulse generated by Q2002 on is supplied to the Q2001 base and Q2001 goes off.

Q2001 and Q2002 go on and off repeatedly according to the time constants of R2004/C2003 and R2007/C2004 and to the vertical trigger pulses.

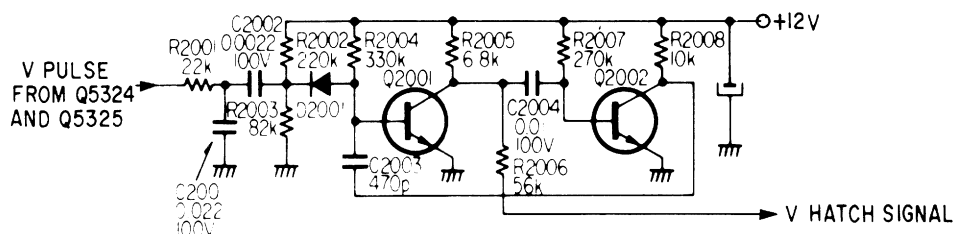


FIG. 13. V HATCH GENERATOR

## 5-2 V BAR GENERATOR

This circuit consists of Q2008 and Q2009. The DC component of the input vertical sawtooth signal is cut in C2009. The negative and positive going lines of the vertical sawtooth signal become slanted through the integrator consisting of C2010 and R2020.

Q2008 comes on when the base voltage is high enough to apply the sawtooth signal. The charged energy of C2010 then flows to ground through Q2008 base and Q2008 goes to off. Thus the collector voltage of Q2008 rises and the base voltage of Q2009 rises, so Q2009 goes, on and Q2008 completely cuts off to rise the emitter voltage of Q2009.

The V BAR pulse is supplied from Q2008 collector. R2025 and R2027 supply the bias voltage of Q2009 base and R2028 supplies the bias voltage to Q2008 base. RV2001 establishes the slice level of the input sawtooth signal and the position of the V BAR pulse.

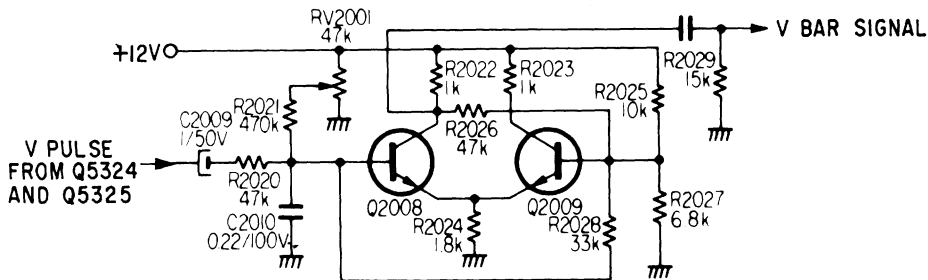


FIG. 14 V BAR GENERATOR



### 5-3 H HATCH GENERATOR

This circuit consists of Q2005 through Q2007. The horizontal pulse from T503(LOT) on G board is supplied to Q2007 base. Q2007, C2007 and L2001 form the oscillator circuit and generate the sine wave signal triggered by the horizontal pulse.

Q2006 varies the sine wave signal to the pulse signal, and Q2005 establishes the emitter bias of Q2006 and the pulse width.

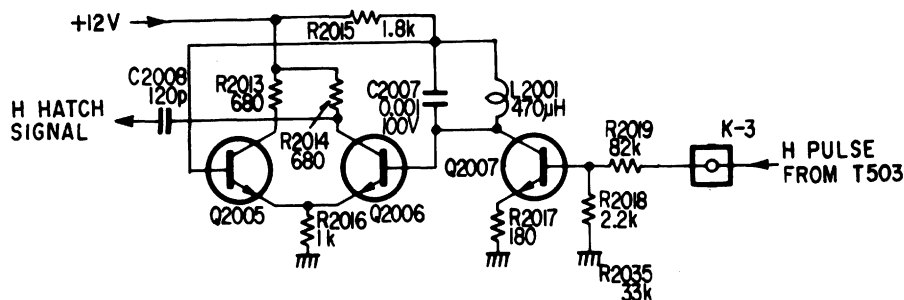


FIG. 15 H HATCH GENERATOR

### 5-4 H BAR GENERATOR

This circuit consists of Q2010 through Q2012. The level of the input horizontal pulse is lowered in R2035 and R2036. The noise component is eliminated in C2042. The input pulse is integrated in C2014 and R2034, and the negative going pulse is only applied to Q2011 base by D2002. The off-pulse of Q2011 is supplied to

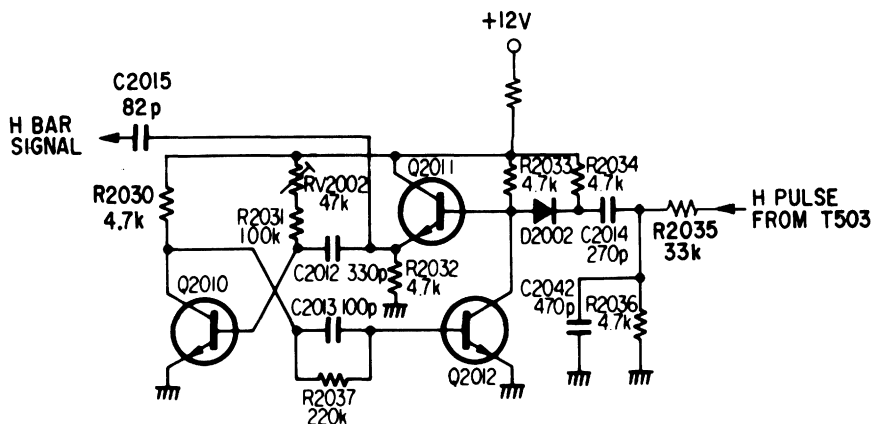


FIG. 16 H BAR GENERATOR

Q2012 is charged through RV2002 and R2031, and Q2010 goes on when the charged voltage become large enough. Thus the on-pulse of Q2010 is applied to Q2012 base and Q2012 goes off while Q2011 goes on. The H BAR pulse is obtained at Q2011 collector.

Q2003 and Q2004 mix the horizontal and vertical bar or hatch pulse and invert them. The mixed pulse is applied to the video switch circuit on A board.



## 5-6 OTHER CIRCUIT

Q2022 is a emitter follower to drive the line output and T2002 isolates the LINE OUT audio jack.

Q2022 controls the line output signal to eliminate noise when the power is turned on or off.

Q2019 through Q2021 form a SEPP amplifier to drive the speakers. IC2003 and Q2023 supply 115 V for the reference voltage of the horizontal size from the 135V line.

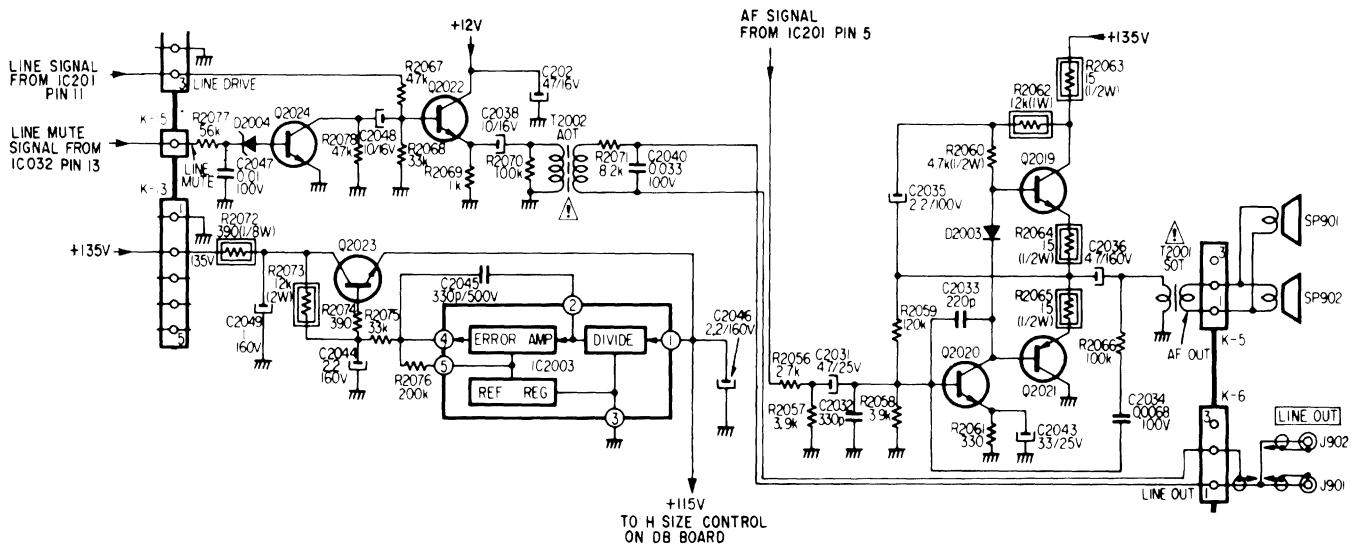


FIG. 18 OTHER CIRCUITS

## 6. DB Board

DB BOARD has three deflection circuit systems for the red, green and blue beams.

Also each circuit system has four circuits for vertical deflection, vertical sub-deflection, horizontal sub-deflection and horizontal pin-cushion compensation. The compensation signals are also supplied to the the neck assembly for simplifying the compensation circuit. The three circuit systems are same, so only red circuit is described below.

### 6-1 VERTICAL DEFLECTION CIRCUIT

The vertical deflection circuit consists of 05301 through Q5306 and forms the SEPP (single-ended pushpull) amplifier circuit including two stage differential amplifiers. The input signal is the vertical sawtooth signal compensated V CENT, V SIZE and V LIN.

R5301 applies the bias for Q5301A. C5301 eliminates noise components from the input signal. R5301 and C5303 damp the back emf (electro motive force) of the deflection yoke and stabilize the SEPP amplifier. R5311 through R5313 detect the current flowing in the deflection yoke. The voltage there is supplied to the Q5301B base and improves the linearity of this amplifier. D5301 drives the base bias for Q5305 and Q5306. +135 V and -15 V is applied to Q5301 through Q5304 for driving Q5305 and Q5306 enough. The power supply of Q5305 and Q5306 is +40 V and 15 V.

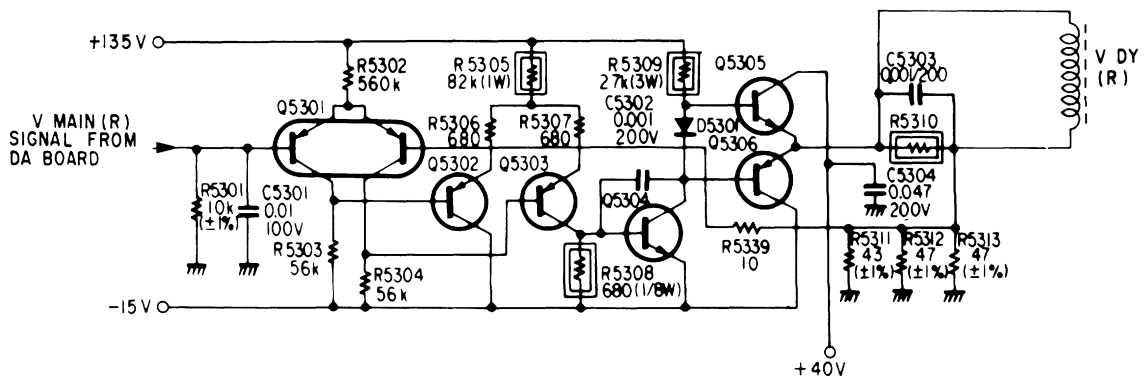


FIG. 19. VERTICAL DEFLECTION CIRCUIT

## 6-2 VERTICAL COMPENSATION OUTPUT CIRCUIT

This circuit consists of Q5307 through Q5311 and forms the SEPP amplifier circuit including a one stage differential amplifier. The input signal is the compensating signal for V SKEW, V KEYS, V BOW and V PIN to supply the neck assembly coil. C5306 eliminates the noise component from the input signal. R5319 damps the back emf of the neck assembly coil. C5309 cuts the DC component from the correcting current. R5320 and R5321 detect the current flowing in the neck assembly coil and the voltage of R5320 and R5321 is supplied to the Q5308 base for improving the linearity of this amplifier. D5302 drives the base bias of Q5310 and Q5311. POWER supply voltage of this circuit is +135 V.

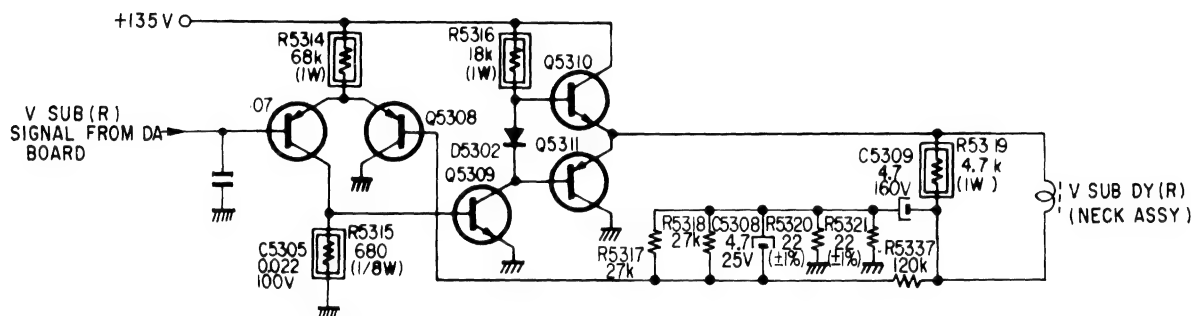


FIG. 20 VERTICAL COMPENSATION OUTPUT CIRCUIT

### 6-3 HORIZONTAL COMPENSATION OUTPUT CIRCUIT

This circuit consists of Q5312 through Q5317 and forms the SEPP amplifier circuit including the two stage differential amplifiers. The input signal is the compensating signal for H CENT, H LIN, H SKEW, H SUB SKEW, H BOW and H SUB BOW to supply the neck assembly coil. R5322 drive the base bias of Q5312A. C5310 eliminates the noise component from the input signal. R5330 and C5319 damp the back emf of the neck assembly coil. R5331 through R5333 detect the current flowing in the neck assembly coil and the voltage across them is supplied to the Q5312B base for improving the linearity of this amplifier. D5303 drives the base bias of Q5316 and Q5317. Power supply voltage of this circuit is  $\pm 15$  V.

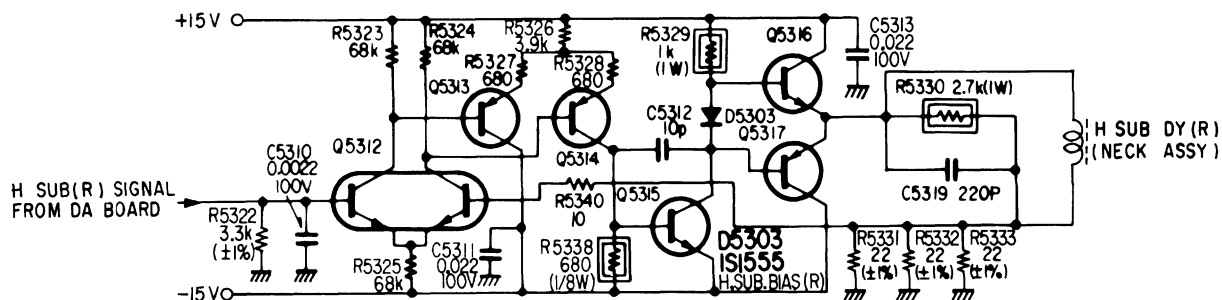


FIG. 21 HORIZONTAL COMPENSATION OUTPUT CIRCUIT

6-4

The pincushion amplifier consists Q5318 and Q5319 for controlling the current in the deflection yoke. The input signal is the composite signal of the bias voltage for H SIZE with H PIN and H KEYS correction signals. C5315 is filter capacitor. L5301, R5336 and C5316 prevent the resonance of the deflection yoke, T5301 (horizontal output transformer: HOT) and C5315, triggered by the vertical blanking pulse.

T301 and D5304 generate the horizontal blanking pulse for the blanking circuit on A board.

Power supply voltage of the pincushion amplifier is +90 V.

The horizontal output circuit consists of Q903 and D5306.

D5306 absorbs the reaction between deflection yokes and permits driving three deflection yokes with one transistor.

D5306 is completely off in the blanking period.

D5305 is a clamper and C5317 is a resonance capacitor.

C5318 compensates the S curve distortion of the deflection and cuts the DC component.

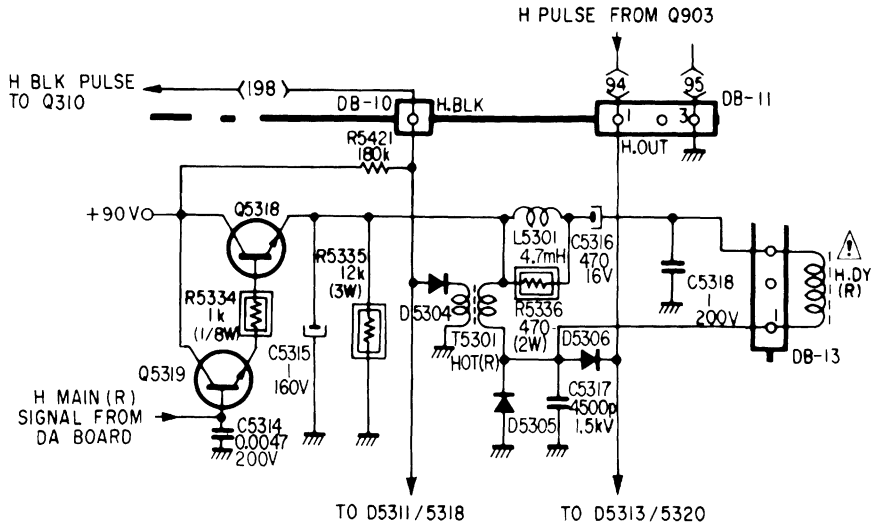


FIG.22 PINCUSHION AMPLIFIER AND HORIZONTAL OUTPUT CIRCUIT

## 7. DA BOARD

DA board has generator circuits triggered by the compensation signal for the vartical and horizontal registration, and also has variable resistors for adjustment.

### 7-1 V SAWTOOTH BUFFER

This circuit consists of Q5508 through Q5510.

Q5510 is a phase inverter to obtain the same level inverted and non-inverted sawtooth signal at the collector and emitter.

Q5508 and Q5509 are emitter followers. R5638 is a bias resistor and C5522 eliminates the noise component of input sawtooth signal. The two sawtooth signals are used for the vertical deflection and to compensate the V SIZE, H SKEW and H KEYS.

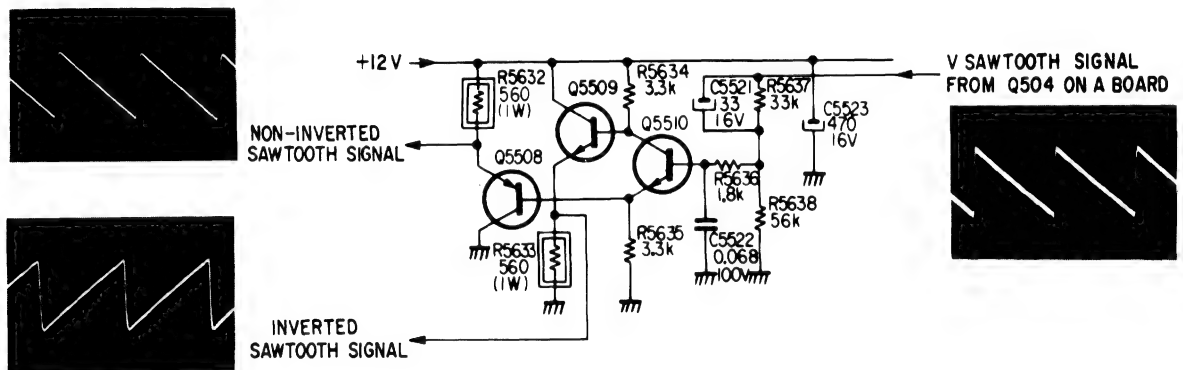


FIG.23 V SAWTOOTH BUFFER



This circuit consists of Q5504 through Q5507. Q5506 and Q5507 form the Miller integrator to convert the sawtooth waveform into the parabola waveform. Q5505 is a phase inverter to obtain the inverted parabola waveform which is of the same level as the input signal. Q5506 is an emitter follower. R5629 and C5520 are used to obtain the high gain. Q5506 emitter applies the non-inverting parabola signal and Q5504 emitter applies the inverting parabola signal. The two parabola signals are used for V LIN, H BOW and H PIN adjustment.

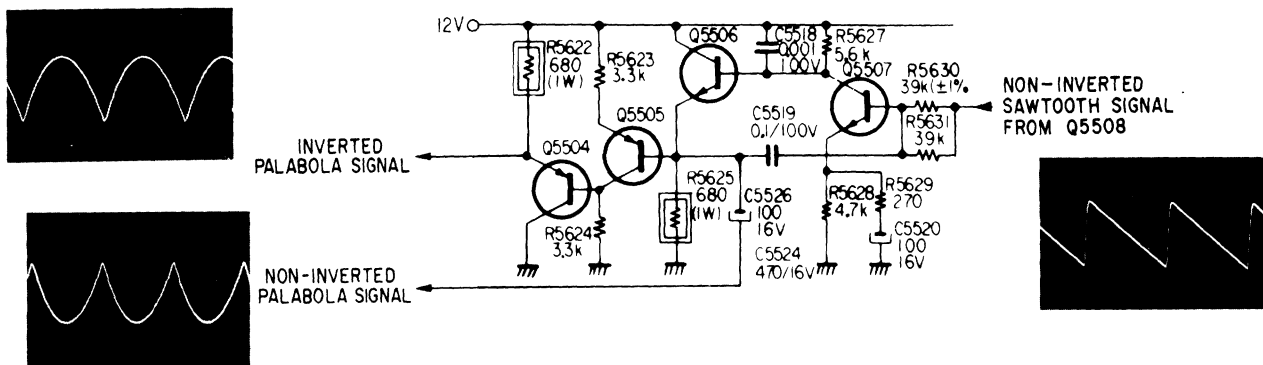


FIG. 24 V PALABOLA GENERATOR

### 7-3 H PIN AMP CIRCUIT

Q5501, Q5502 and Q5503 are H PIN AMP circuit for blue, red and green pictures.

H KEYS and H PIN compensation signals are added to the H SIZE bias signal in Q5501 and Q5502. C5512, C5514 and C5516 cut the DC component from the compensation signal.

The compensation signal for the green is formed from the fixed H keys signal by R5549 and R5550.

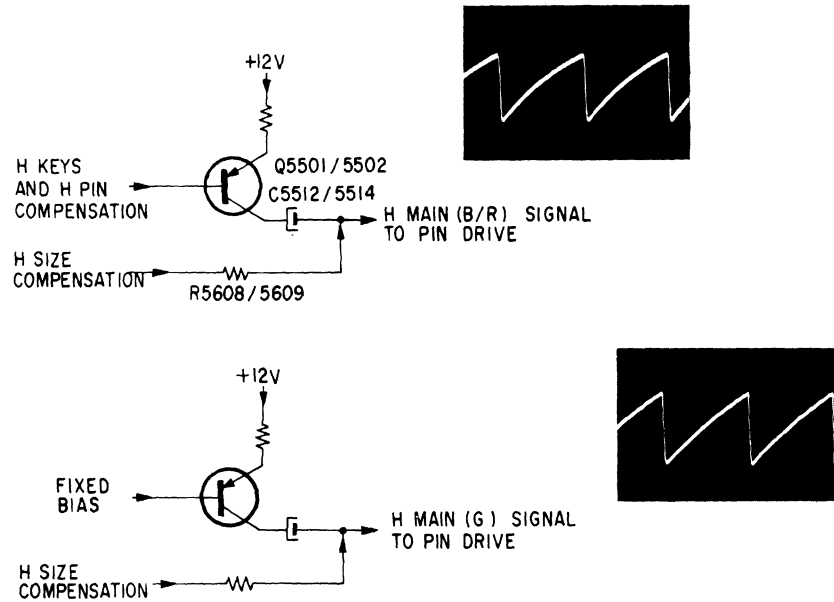


FIG. 25 H PIN AMP CIRCUIT

This circuit consists of Q5523 through Q5525. The input signal is the negative horizontal pulse from T5302 on DB board and is converted to the sawtooth signal in C5540, C5542 and R5675. Q5525 is a phase inverter to obtain the same level inverted and noninverted sawtooth signal at the collector and emitter. Q5523 and Q5524 are emitter followers. The two horizontal sawtooth signals are used for V SKEW adjustment. R5674 applies the bias to Q5525 base.

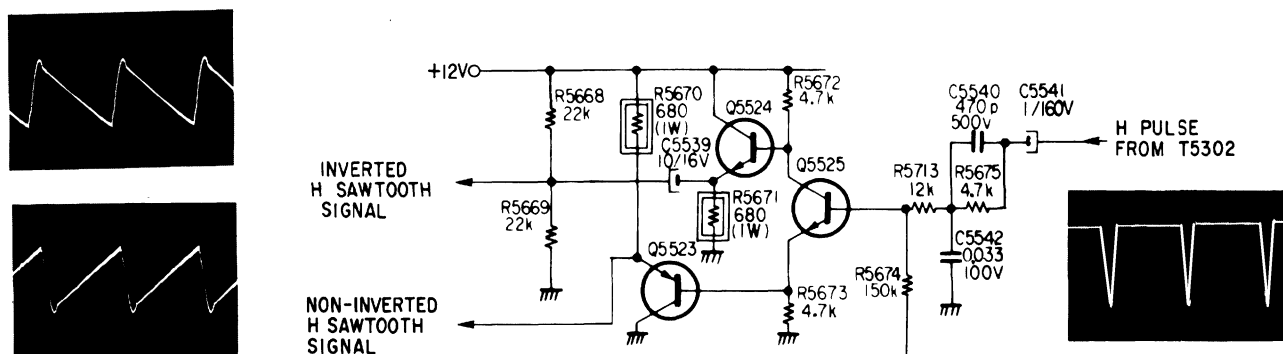


FIG. 26 H SAWTOOTH BUFFER

This circuit consists of Q5537 through Q5539.

The horizontal pulse of the input signal is changed to a palabola signal in L5502 and C5555. R 5709 and R5711 furnish the Q5539 base bias. Q5539 is a phase inverter to obtain the same level inverted and non-inverted palabola signal at the collector and emitter. Q5537 and Q5538 are emitter followers. The two horizontal palabola signals are used for V BOW and H LIN adjustment.

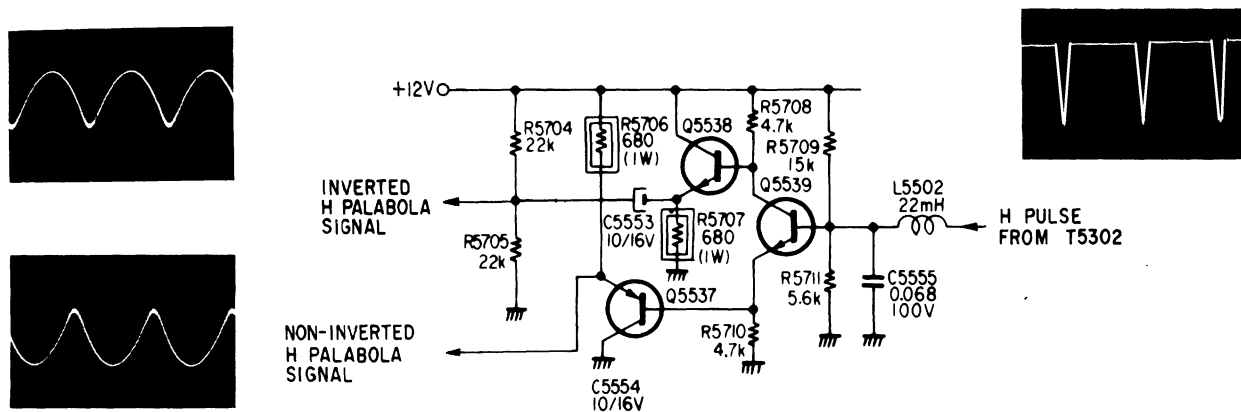


FIG. 27 H PALABOLA BUFFER

This circuit consists of Q5520, Q5521 and Q5522. The input signals are as follows: The non-inverted vertical sawtooth signal supplied to Q5522 base. The inverted vertical sawtooth signal applied to Q5521 base. The non-inverted horizontal sawtooth signal applied to Q5520A source. The inverted horizontal sawtooth signal applied to Q5520B source. R5666 and R5667 supply the bias to Q5522 base and R5663 supplies the bias to Q5521 base. R5659 through R5662 establish the bias of Q5520 gates. The direction of compensation is different at the upper and lower sides of screen, so four input signals are mixed in this circuit.

In the fast portion of the vertical period, the non inverted sawtooth signal is low level and the inverted sawtooth signal is high level. Q5521 conducts in this time and the collector voltage is low. The collector voltage then becomes to high slowly. Q5522 is cut off and slowly begins to conduct.

At fast, the collector voltage of Q5522 is high and then decreases to low slowly. The output signal of Q5520 drain in the vertical period is as follows.

At fast half period, a large inverted horizontal sawtooth signal is obtained and it slowly decreases to zero.

At last half period, the non-inverted horizontal sawtooth signal becomes large slowly from zero and stops at the end of the vertical sawtooth signal, and the output signal is change to the large inverted horizontal sawtooth signal.

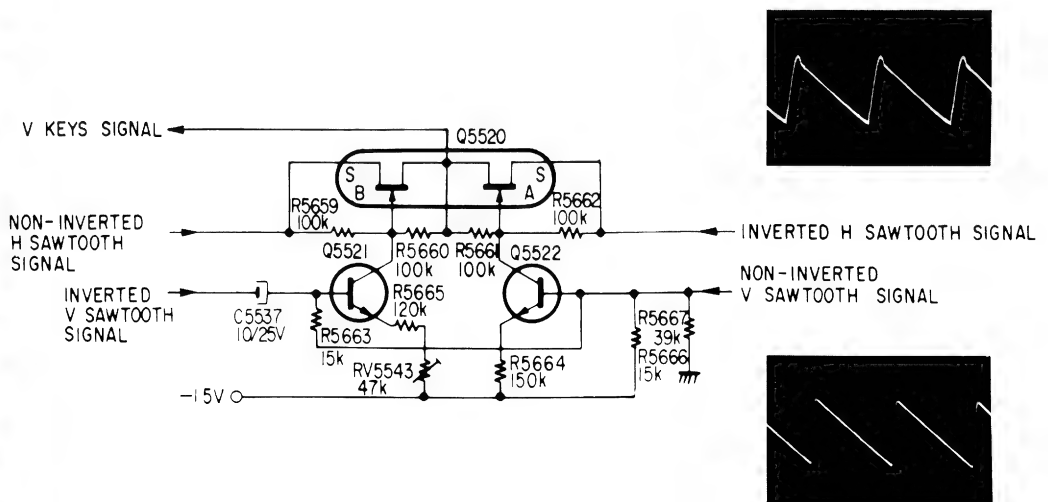
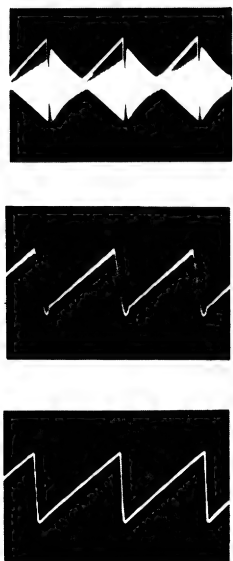


FIG. 28 V KEYS GENERATOR

## 7-7 V KEYS BUFFER

This circuit consists of Q5516 through Q5519. Q5518 and Q5519 are a phase inverter forming a differential amplifier circuit.

The inverted V KEYS signal is obtained at the collector of Q5519. The level of the two signals is the same.

Q5516 and Q5517 are emitter followers.

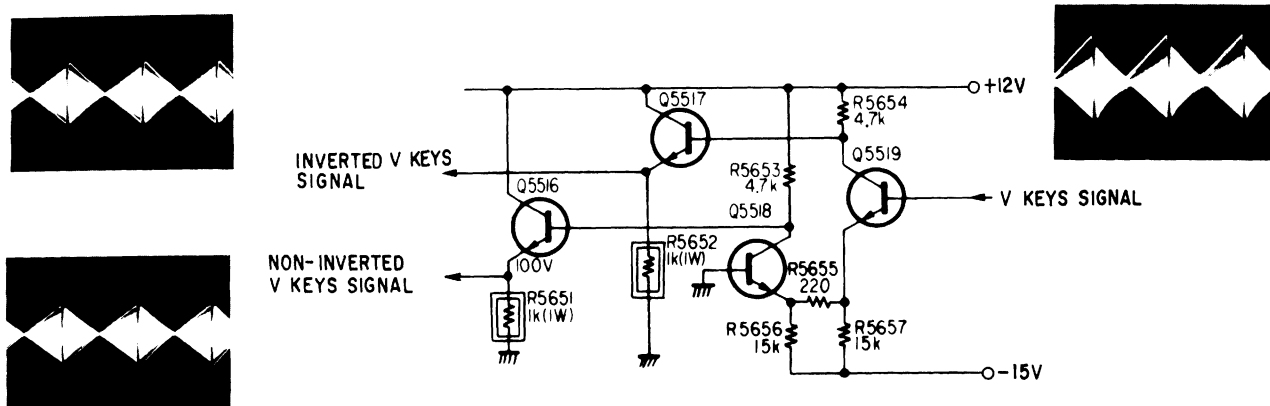


FIG. 29 V KEYS BUFFER

## 7-8 V PIN GENERATOR

This circuit consists of Q5512 through Q5515. Q5515 and C5532 form an integrator to integrate the horizontal component of the input signal, so that the horizontal sawtooth signal is changed to the parabola signal. The vertical sawtooth wave is supplied to the Q5515 collector to shift the V KEYS signal, so the vertical pincushion correction signal is obtained.

Q5514 is a phase inverter. Q5512 and Q5513 are emitter followers.

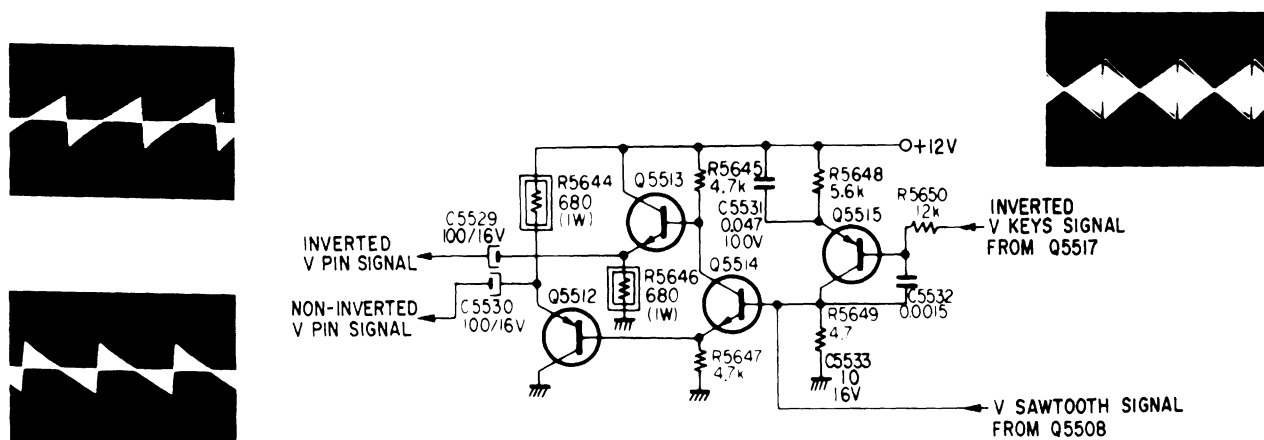


FIG. 30 V PIN GENERATOR

This circuit consists of Q5534, Q5535 and Q5536.

The input signals are as follows:

The non-inverted vertical parabola signal is applied to Q5536 base. The non-inverted horizontal sawtooth signal is applied to Q5534A source. The inverted horizontal sawtooth signal is applied to Q5534B source. R5700 and R5701 supply the bias to Q5536 base and R5693 through R5696 establish the bias of Q5534 gates. The inverted horizontal sawtooth signal is changed to the amplitude-moduration signal from the inverted vertical parabola signal in Q5534B. C5550 and R5697 supply the fixed bias to Q5535 base. The constant value of the non-inverted horizontal sawtooth signal is obtained at Q5534A drain and adds to the amplitude-moduration signal of the inverted horizontal sawtooth signal.

The purpose of this constant signal is to assure that the middle of the correcting signal does not affect the screen.

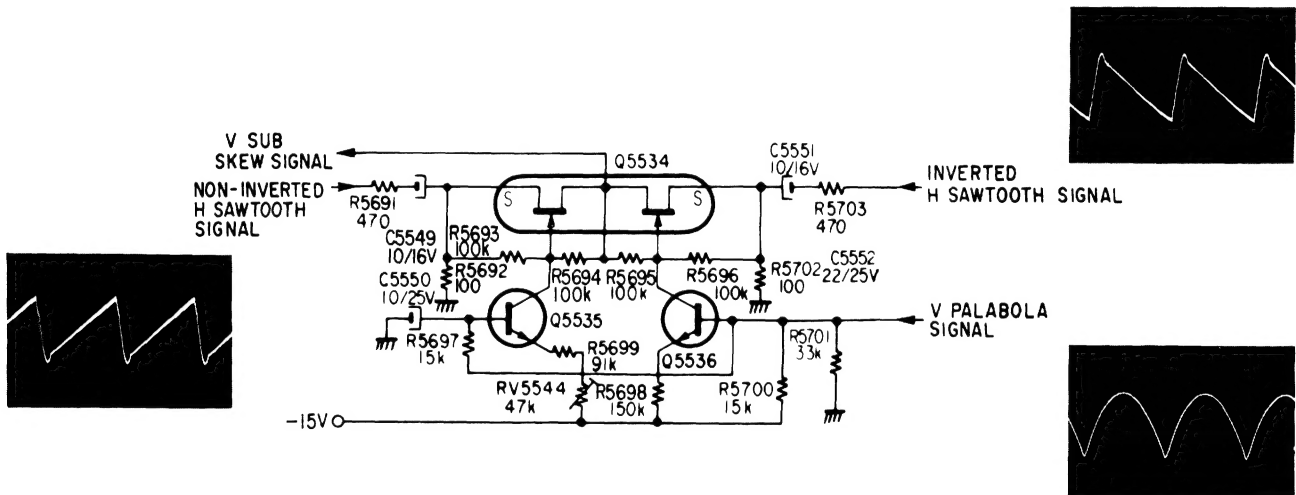


FIG. 31 V SUB SKEW BUFFER

## 7-10 V SUB SKEW BUFFER

This circuit consists of Q5530 through Q5533. Q5532 and Q5533 are a phase inverter forming a differential amplifier circuit. The inverted V SUB SKEW signal is obtained at Q5532 collector and the non-inverted V SUB SKEW signal at Q5533 collector. The two signals are of the same level.

Q5530 and Q5531 are emitter followers.

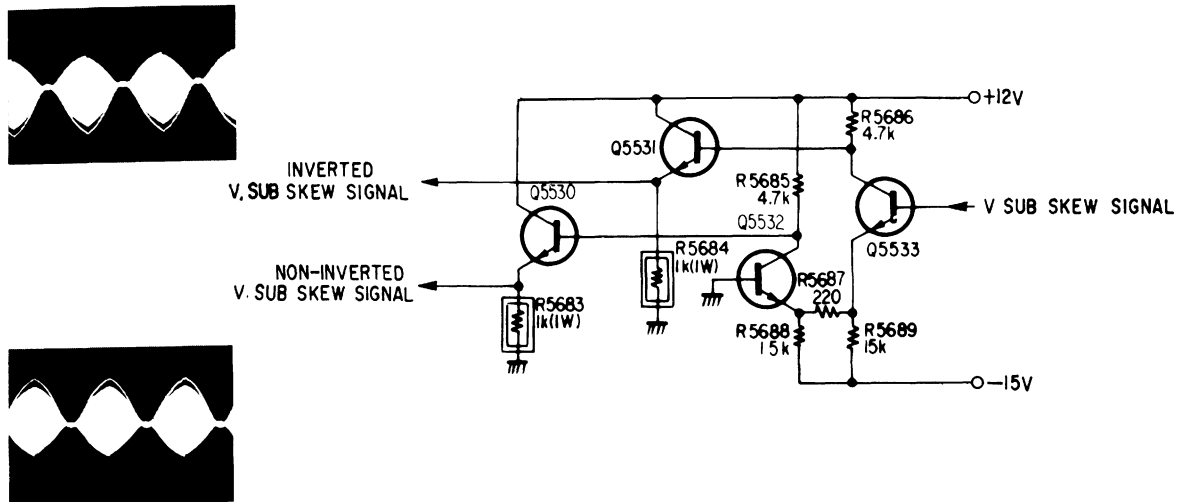


FIG. 32 V SUB SKEW BUFFER

## 7-11 SUB BOW GENERATOR

This circuit consists of Q5526 through Q5529. Q5529 and C5546 form an integrator to integrate the horizontal component of input signal, so the horizontal sawtooth signal is changed to the parabola signal.

Q5528 is a phase inverter and Q5526 and Q5527 are emitter followers.

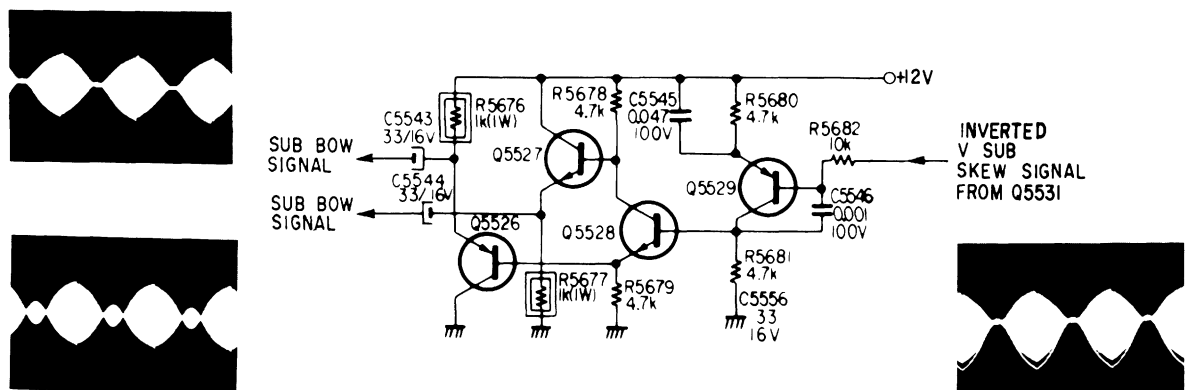


FIG. 33 SUB BOW GENERATOR





## CORRECTION

Correct the service manual as shown below.

 : corrected portion

### Page 43: 4-4. G BOARD ADJUSTMENT

When replacing the following components, make the HV HOLD DOWN and HV REG adjustments.

G board, DC block

R904 .....in DC block

IC501, Q801, Q802, Q803, D502,  
D801, D802, D803, R517, R802, R803, } ...in G board  
R804, R809, R825, C806, C807, T801 }

When replacing the following components, make the HV REG adjustment.

R905 .....in DC block

Q806, Q807, D807, D808, D809, }  
D810, R814, R815, R816, R826, Q808 } ...in G board

Q904 ..... chassis